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Executive Summary

This report reflects the activity of the Field Surveillance Group of the Alberta Energy and Utilities Board (EUB) for the period April 1, 1999 to March 31, 2000. It is used by field staff and the EUB to report on industry performance and provide an overview of the areas of activity that the EUB's Field Surveillance Group places emphasis on.

The following are highlights of the trends that provide a sense of how industry is doing:

- The drilling kick occurrence has remained relatively constant over the last three years even though the level of drilling activity has increased significantly.
- Inspection results for drilling and servicing operations have improved over the previous year's results.
- Oil production facility inspections continue to see a decrease in major unsatisfactory items.
- Increased activity has not resulted in overall increased complaints or major and/or serious unsatisfactory inspection results. However, there has been an increase in the number of complaints related to gas production facilities.
- Corrosion continues to be the cause of the majority of pipeline failures.
- The number of contact damage hits on pipelines continues to drop.

As a result of our analysis of the 1999/2000 inspection results and in response to concerns raised by the public and industry regarding improved field presence and inspection coverage, Field Surveillance will be initiating the following actions:

- Increase the number of complainant callbacks to ensure issues have been adequately addressed.
- Increase the number of field staff by 12 during the 2000/01 fiscal year and by six for each of the next three fiscal years.
- Increase communication and education efforts through active participation in synergy groups; information and education presentations, open houses, and increased field presence.
- Improve application and operation dispute resolution efforts by providing training to field staff in facilitation and mediation techniques and skills.
- Increase inspection focus regarding the following:
    - drilling and service rig blowout prevention equipment functionality and crew training
    - clean-up and abandonment of inactive facilities

- fugitive emissions, noise, flaring, and black smoke associated with gas related operations
- construction and operation of pipelines and prevention of contact damage to pipelines
- application of the appropriate level of enforcement for all non-compliant inspections

- Increase technical support for review of pipeline applications, operations, surveillance, and hearings.

Notwithstanding the continued high level of activity, the increased inventory of wells and facilities, and the aging pipeline infrastructure, the inspection results continue to indicate that overall industry is doing a good job respecting compliance with the regulations and approval conditions.

Section 1 Summary of Inspections, Enforcement, Public Complaints, and Stakeholder Involvement Efforts

1.1 Introduction

The EUB's Field Surveillance group has eight field centres located throughout the province (see Figure 1). Each field centre has staff that conduct inspections, handle emergencies, and address public complaints. Most staff are also involved with facilitation[1] work and other efforts to improve communication and assist industry and the public in resolving issues.

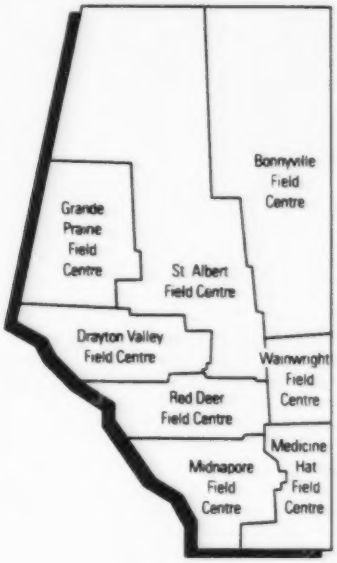

Figure 1. EUB field centre boundaries

The following is a summary of inspections, enforcement, public complaints, and stakeholder involvement efforts.

1.2 Inspections

EUB field inspections are prioritized based on the weighting of three key criteria, known as OSI: *operator* history, site *sensitivity*, and *inherent* risk of the facility/operation. EUB inspectors focus on those operators with previous unsatisfactory inspections, including repeated noncompliance. Sensitivity of the area where the operation is taking place is also reviewed and includes items such as proximity to the public or water bodies and areas where there has previously been significant public concern regarding oil and gas operations. The inherent risk of a facility or operation is determined by reviewing specific

[1] When members of the public have concerns with a particular industry project and the parties are having difficulty resolving issues on their own, Field Surveillance staff facilitate the resolution process. Staff assist with the improvement of communications, information sharing, and identification of issues and options available and by ensuring that EUB requirements and processes are understood.

technical details about the facility, such as complexity of the operation and whether the facility is sweet or sour.

The total number of field inspections increased slightly from 7244 during 1998/1999 to 7340 in 1999/2000. The number of inspections remains at a much higher level than in 1997/1998, when 3839 inspections were conducted. The overall percentage of major/serious unsatisfactory inspections was reduced from 5.6 per cent in 1998/1999 to 3.5 per cent in 1999/2000.

EUB Action

- It is important that the EUB maintain a significant presence in the field and conduct an appropriate number of inspections to ensure industry compliance. In addition, more resources are required in the facilitation and synergy group[2] areas. Therefore, 12 additional staff will be added to the field surveillance complement in 2000/2001 to conduct inspections and assist the public and industry in resolving issues.

Table 1 summarizes the field inspections that took place in 1999/2000 and includes the total number of initial[3] inspections and reinspections[4] in each inspection category. Also included are the satisfactory and minor, major, and serious unsatisfactory inspections for each inspection category.

Examples of minor unsatisfactory items are

- calibration expired on a gas meter, and
- garbage and debris not stored in a reasonable manner at an oil or gas facility.

Examples of major unsatisfactory items are

- failure of blowout prevention equipment on a drilling or service rig, and
- hydrogen sulphide release causing odours off lease at an oil battery.

Examples of serious unsatisfactory items are

- blowout prevention equipment missing where required on a drilling or service rig, and
- unaddressed spill into water, operator aware, but no action taken.

[2] To ensure that the impact of resource development and operations is minimized on an ongoing and proactive basis, synergy groups are formed to identify issues and work on collaborative solutions to the problems identified. Synergy groups usually involve public, industry, and appropriate government representatives. EUB staff will assist and support the organization of these groups, but the strength and success of these groups lie in the direct input and active participation of the public and industry.

[3] An initial inspection is the first inspection on a facility in a designated time period.

[4] A reinspection is a follow-up inspection to a deficiency found at a facility during an initial inspection.

Table 1. Field inspections,[1] 1999/2000

	Initial	Satisfactory	Minor unsatisfactory	Major unsatisfactory	Serious unsatisfactory	Reinspection
Drilling rigs	631	549	32	50	0	0
Service rigs	350	314	23	13	0	0
Oil production facilities	4244	2707	1407	127	3	1346
Gas production facilities	627	402	200	25	0	195
Pipeline construction/testing	379	298	76	3	2	10
Pipeline failure inspections	437	N/A	N/A	N/A	N/A	N/A
Pipeline operations inspections	331	90	210	31	0	45
Waste management facilities[2]	42	22	17	3	0	0
Drilling waste management	299	250	N/A[3]	N/A	N/A	0
TOTAL	7340	4632	1965	252	5	1596

[1] For definition of minor, major, and serious unsatisfactory inspections, see Section 1.3 below.

[2] Waste management facility inspections were conducted in two stages. The first stage was done prior to having an enforcement ladder in place for these inspections; therefore, 43 inspections are not included in this table. Stage two results are included. See Section 7.4.1.

[3] Unsatisfactory drilling waste management inspection results do not distinguish between minor/major/serious; therefore, they are not included in this table.

Note that details for each inspection category are found in various sections throughout this report.

1.3 Enforcement

Companies that fail to meet requirements or follow EUB direction are subject to escalating enforcement consequences. The required response to EUB direction and subsequent continued compliance with regulations result in the company's compliance status reverting back to satisfactory.

The Field Surveillance group has developed generic enforcement ladders to ensure that a firm, fair, and consistent approach is taken for all noncompliance situations. Enforcement actions escalate to a higher level if the company repeatedly fails to meet EUB requirements.

This enforcement process

- improves EUB staff consistency, efficiency, and effectiveness;
- results in increased public safety, minimizes environmental impacts, and improves conservation;
- helps create a level regulatory playing field for industry; and
- improves EUB and industry accountability.

Table 2 summarizes the oil and gas operations that were shut down in 1999/2000 as a direct result of EUB enforcement action and the estimated cost to industry (also see Figure 2).

The following definitions are from *Informational Letter 99-4: EUB Enforcement Process* and apply to these terms used throughout this report:

- **minor unsatisfactory event/inspection**—a contravention of regulation(s)/ requirement(s) that does not result in a direct threat to the public and/or the environment and does not adversely affect oil and gas operations

- **major unsatisfactory event/inspection**—a contravention of regulation(s)/ requirement(s) that an operator has failed to address and/or has the potential to cause an adverse impact on the public and/or the environment

- **serious unsatisfactory event/inspection**—a total disregard for regulation(s)/ requirement(s) that is causing or may cause a significant impact on the public and/or environment

Table 2. Facilities/operations shut down at EUB Field Surveillance request, April 1, 1999, to March 31, 2000

Type	Approximate number of suspensions	Average duration of shutdown	Estimated amount of deferred cash flow[1] ($)	Estimated cost ($)	Most common reasons for suspensions
Drilling rigs	50	1.62 hours		60 750	- Operational failure of BOP/accumulator system - Crew training
Service rigs	13	1.53 hours		6 000	- Failure of blowout preventers to function - Operational failure of the accumulator system
Oil production batteries	65	13.9 days	2 327 680		- H_2S emissions - Spills
Gas facilities	11	9.5 days	779 770		- H_2S emissions
Pipelines under construction	9	1.0 days	36 000	22 500	- Ground disturbance activities
Pipelines in operation	17	3.5 days	100 750	276 750	- Corrosion integrity work
Injection wells, disposal wells	46	Not calculated	N/A	Not calculated	- Failure to submit packer isolation tests
Subtotal			3 244 200	366 000	
TOTAL	211		3 610 200		

[1] Compiled using data from EUB field centres. Where direct estimates were not available from the involved companies, cost estimates were as follows: $750/hour for drilling rig time; $300/hour for service rig time; $115/$m^3$ for value of conventional/bitumen oil production; $140/10^3 m^3$ for value of gas production; and $200/hour for pipeline construction down time.

Costs of suspensions are as supplied by industry where available. Where necessary, costs were calculated from production reports.

1.4 Public Complaints

1.4.1 EUB Response to Public Complaints

Energy exploration and development activity was significant in 1999/2000. The EUB recognizes that with this high activity level there will be associated public concerns. The EUB places a high priority on addressing these public concerns.

Field Surveillance staff respond to all complaints. The aim is to ensure prompt, effective, and lasting resolution of any problem that is identified. However, the EUB can only respond to issues within its jurisdiction; if a complaint is received by the EUB that is beyond its scope, the complainant will be directed to the appropriate agency.

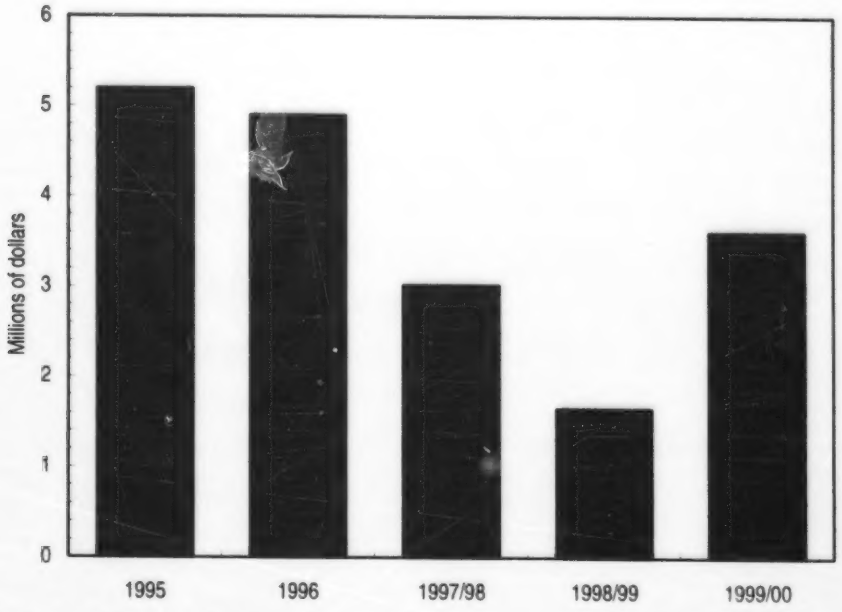

Figure 2. Deferred cash flow and cost to industry due to shutdowns at EUB Field Surveillance request

During the 1999/2000 reporting year, the EUB received and responded to 859 complaints, compared to 851 in the previous year. Some complainants reported concerns about more than one issue, resulting in the EUB recording 1032 issues associated with the 859 complaints. The number of complaint issues decreased from 1053 in 1998/99 to 1032 in 1999/2000 (see Figure 3).

EUB Action

- The EUB will continue to expect industry to comply with requirements. In addition, the EUB will continue to emphasize the benefits and importance to industry of good communication with the public. The goal is to reduce the number of complaints and ensure lasting compliance.

1.4.2 Complaint Follow-up

The EUB conducts a random complaint follow-up to gauge the complainant's level of satisfaction with both EUB and industry responses. This information is analyzed annually to identify if changes are required to complaint response procedures by either the EUB or industry.

The EUB conducted 400 complaint callback surveys in 1999/2000. Results indicated that

- 81 per cent of incidents were resolved to the satisfaction of the complainants,
- 89 per cent of the complainants were satisfied with the company response, and
- 99 per cent of the complainants were satisfied with the response from the EUB.

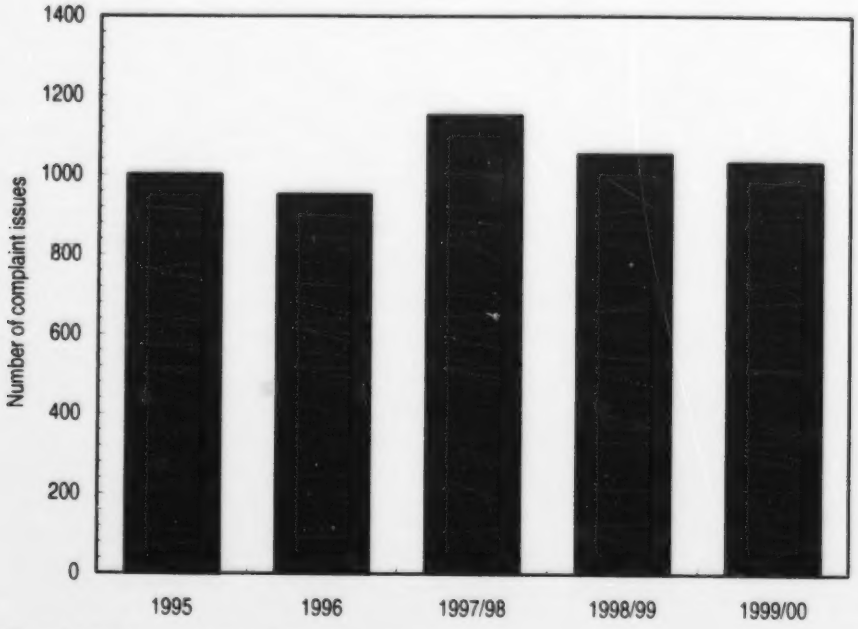

Figure 3. Number of complaint issues recorded

EUB Action

- The EUB will target 60 per cent of complaints for follow-up to ensure continued effectiveness of the complaint-handling process in 2000/2001.

1.4.3 Types of Public Complaints

The EUB receives complaints on a variety of issues. Historically, the most common issues have been related to odours, flaring, lease management, and public health and safety (see Figure 4).

Even though there were significant increases in oil and gas activity, the overall number of complaints remained relatively the same. Two areas that showed an increase in complaints were odours and flaring.

Analysis of the odour complaints revealed that emissions were from a wide range of sources (see Figure 5). As can be seen, wells and oil and gas facilities were the largest sources of odours, at 67 per cent. Equipment failures were identified as the most significant cause of the fugitive emissions problem.

The EUB believes that the increase in flare/smoke complaints is, in part, a result of the release of *Guide 60: Upstream Petroleum Industry Flaring Guide*. Growing media and public attention to flaring has contributed to the increased number of complaints.

The EUB, in conjunction with industry and the Clean Air Strategic Alliance (CASA), has undertaken several initiatives to reduce the volume of gas flared and improve flare efficiency, which should result in a reduction in the number of complaints related to flaring. These initiatives include an increased emphasis on gas conservation programs,

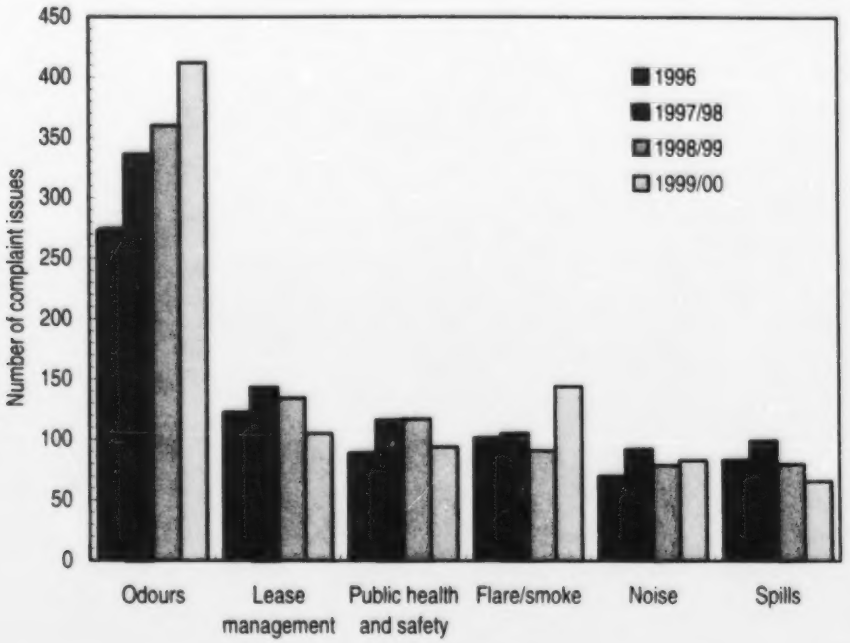

Figure 4. Distribution of complaints by issue

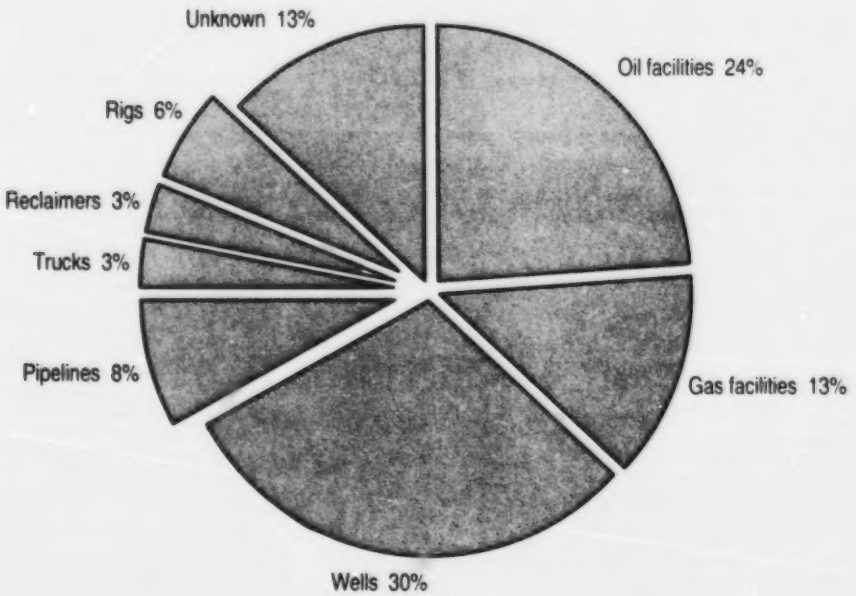

Figure 5. Odour complaints by source, 1999/2000

reduction in duration of well tests, and improved infrastructure and technological advancements, such as using waste gas for electrical power generation.

EUB Action

- Staff will communicate to industry the most common problems found related to complaints (e.g., equipment failure, operating practices) and the need to ensure that appropriate remedial measures are taken.

- The EUB will expect operators to reduce odour occurrences. Efforts will be focused on increased inspections, more education and awareness on the part of industry, and, when necessary, application of escalating consequences when operators fail to respond to public complaints.

1.5 Stakeholder Involvement Efforts

1.5.1 Facilitation Work

It is industry's responsibility to discuss their proposals with the public and to identify and address concerns with only limited EUB staff involvement. However, when issues or concerns arise that have not been resolved satisfactorily, EUB field staff are available to assist in bringing the parties together and help to open effective dialogue. Field staff

- discuss concerns regarding proposed development,

- assist the public in understanding what the EUB requirements of industry are,

- facilitate the discussion of possible solutions,

- assist in understanding what issues and areas are within the EUB mandate, and

- ensure understanding of alternative EUB processes available to parties.

In 1999/2000, EUB field staff spent 452 days on facilitation efforts. Field surveillance staff were involved in a total of 68 facilitations, of which 46 were successfully resolved and 12 went or are in the process of going to a hearing. Facilitation efforts are ongoing with the remaining 10.

Public issues and concerns are increasingly complex and accordingly more difficult to resolve. Therefore, it is important that all dispute resolution options be explored.

EUB Action

- The EUB has approved the implementation of Appropriate Dispute Resolution (ADR) in the application process, which includes options such as third-party mediation. Significant work will be completed in 2000/2001 to ensure that the ADR process is effective and understood by stakeholders.

- Additional resources and training of existing staff will be implemented in 2000/2001. This will ensure that Field Surveillance capability to handle the increased workload is enhanced.

- The EUB is considering how to incorporate ADR into operational issues.

1.5.2 Synergy Groups

As in previous years, it has proven effective to bring industry and concerned citizens together for the purpose of constructive dialogue and effective action to address issues. The EUB terms such working groups "synergy groups." Bringing the public and industry together is a good first step in developing an acceptance of coexistence. Currently Field Surveillance staff participate in approximately 40 of the 45 groups throughout the province.

EUB Action

- In situations that are conducive to industry-public forums, field staff will continue to encourage and, where appropriate, participate in synergy groups.

1.5.3 Open Houses

In March 2000, the Wainwright field centre hosted an open house to improve communication between EUB field staff and other stakeholders. EUB Board Members and management were also present to meet with the 183 attendees from the public, industry, and other government agencies. Presentations were made on EUB communication efforts, the Wainwright and area synergy groups, flaring requirements, and enforcement. Based on feedback from many of those in attendance, the open house was deemed a success in improving communication among industry, the public, and the EUB.

EUB Action

- In 2000/2001 and based on what was learned from the Wainwright open house, additional open houses will be held at a number of selected locations throughout the province.

Section 2 Drilling and Servicing

2.1 Introduction

The EUB is responsible for the regulation of drilling and servicing operations to ensure public safety, conservation of resources, and environmental protection. This is accomplished through existing regulations and requirements, conducting compliance inspections, monitoring operator and contractor performance, evaluating incidents, and applying fair and firm enforcement action in cases of noncompliance.

2.2 Well Control Occurrences

To assist in analyzing drilling and servicing operations, the EUB collects key well control occurrence data. This information assists the EUB in monitoring industry performance and identifies when changes to regulations, inspection procedures, or operating practices may be required.

One of the primary indicators of industry's drilling and servicing performance is the number of well control occurrences and industry's response to these incidents.

2.2.1 Drilling—Blows/Blowouts/Kicks

Five blowouts[5] and one blow[6] were recorded during the drilling of 11 548 wells in 1999/2000 (see Table 3). Three of the blowouts were freshwater flows that occurred while drilling a surface hole (this is the first stage of drilling where no surface pipe or blowout preventers are in place). The other two blowouts were more significant and both generated media attention. A marginally sour oil well blowout in southern Alberta was ignited and the short-term evacuation of two families to minimize public and environmental impacts; a sweet gas well blowout occurred in a remote area of northern Alberta and self-ignited. Both blowouts resulted in considerable equipment loss. Fortunately, there were no injuries and all wells were successfully brought under control with minimal environmental damage.

Table 3. Drilling and servicing well control occurrences, 1999/2000

	Drilling	Servicing
Blowouts	5	7
Blows	1	2
Kicks	123	N/A

[5] The complete loss of control of the flow of fluids (gas, oil, water, mud) from a well. Control can only be regained by installing or replacing equipment to permit shut-in or killing the well or by drilling a relief well.

[6] The unexpected release of wellbore fluids (gas, oil, water, mud) to the atmosphere. The flow can be controlled almost immediately by shutting the well in using wellhead valves or blowout prevention equipment or by directing the flow to the flare system until the well is killed.

During 1999/2000 the kick[7] occurrence rate averaged 12 kicks per 1000 wells drilled. This rate has remained relatively constant for the last three years and is a significant improvement from the years prior to 1997/1998, when the kick occurrence averaged 23 kicks per 1000 wells drilled.

2.2.2 Servicing—Blows/Blowouts

In well servicing operations there were two sour well blowouts and five sweet well blowouts. Two blows were also recorded (see Table 3). Fortunately no injuries occurred and all wells were successfully shut in with minimal environmental damage and equipment loss.

EUB Action

- EUB staff will review all blows and blowouts related to drilling and servicing operations to identify changes to equipment and procedures that can be made to reduce drilling and servicing blows and blowouts.

- The EUB expects industry to maintain its high training standards for rig personnel in well control procedures and crew training. These will continue to be high-priority inspection areas for EUB inspection staff.

2.3 Drilling—Inventory, Activity Levels, and Inspections

The 11 548 wells drilled in the province during 1999/2000 was a significant increase over the 7094 wells drilled in the 1998/1999 reporting year. The 1999/2000 addition of new wells drilled brings the total number of nonabandoned wells in Alberta to over 136 000.

During the 1999/2000 reporting period, EUB field inspectors conducted 631 inspections on drilling operations, resulting in 82 (major and minor) unsatisfactory inspections. This compares to 696 inspections, with 105 (major and minor) unsatisfactory, recorded in 1998/1999. The percentage of unsatisfactory inspections decreased in 1999/2000 to 12.9 per cent — an improvement over 1998/1999, when the unsatisfactory inspections totalled 15 per cent (see Table 4). Satisfactory inspections were conducted on 87.1 per cent of rig inspections in 1999/2000.

Table 4. Alberta drilling activity and EUB inspection results

	1995	1996	1997	1998/99	1999/00
Wells drilled	8907	10773	13075	7094	11548
Drilling rigs inspected	393	458	421	696	631
% inspected	4.4	4.2	3.2	9.8	5.5
% satisfactory	87	88	79	85	87.1
% unsatisfactory (total major and minor)	13	12	21	15	12.9

[7] Any unexpected entry of water, gas, oil, or other formation fluid into a wellbore that is under control and can be circulated out.

EUB Action

- The EUB rig selection criteria for conducting priority inspections are based on a point system that includes operator/contractor performance, environmental sensitivity, and inherent risk (OSI). Continued use of a priority inspection system that targets operators with previous unsatisfactory inspections and higher risk operations should result in further reductions in the overall unsatisfactory inspection rate.

- EUB field staff will continue to make presentations to drilling contractors and operators to ensure that regulations and requirements are understood.

- Ensuring that industry meets drilling requirements continues to be an EUB inspection priority. Applying consistent enforcement action for noncompliance will increase industry awareness of EUB requirements.

2.3.1 Drilling—Major Unsatisfactory Items

A major unsatisfactory item is a contravention of EUB regulations that could

- restrict a rig crew's ability to safely detect and circulate out a kick or shut in a well;

- contribute to an operational failure of the blowout prevention (BOP) equipment; or

- impair a rig crew's ability to maintain control of a well.

Of the 631 drilling inspections conducted in 1999/2000 by EUB field staff, 50 major unsatisfactory inspections with a total of 59 major unsatisfactory items were recorded. Operational failures of the BOP/accumulator systems resulted in 27 of those deficiencies, while deficiencies in crew training accounted for the remaining 32 (see Figure 6).

Drilling operations were suspended at all rigs with major unsatisfactory items until they were corrected. This resulted in 50 shutdowns, totalling approximately 81 hours. This compares to 50 rig shutdowns, totalling about 57 hours of shutdowns, last year.

EUB Action

- The EUB will continue to take enforcement action for all unsatisfactory inspections, including suspending operations with major unsatisfactory items.

2.4 Servicing—Major Deficiencies

In 1999/2000 the EUB conducted 350 inspections on well servicing operations, resulting in 36 unsatisfactory inspections. This compares to 392 inspections in 1998/1999, which resulted in 48 unsatisfactory inspections. Of the 36 unsatisfactory inspections in 1999/2000, 13 were major with a total of 18 major unsatisfactory items noted, compared to 19 total major unsatisfactory items noted in 1998/1999. Operational failures of the BOP/accumulator systems accounted for 17 of the major deficiencies and one major deficiency was recorded under crew training (see Figure 7).

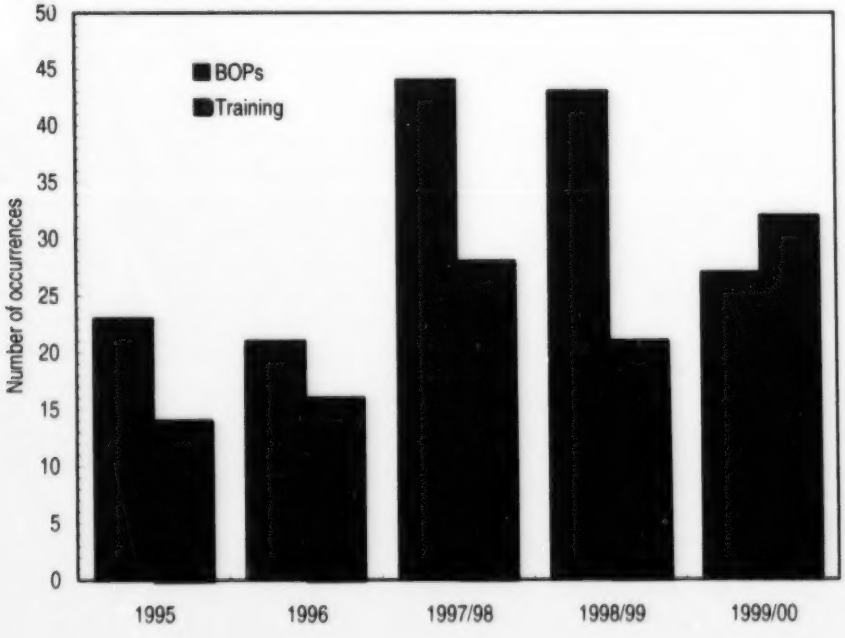

Figure 6. Major deficiencies on drilling rigs

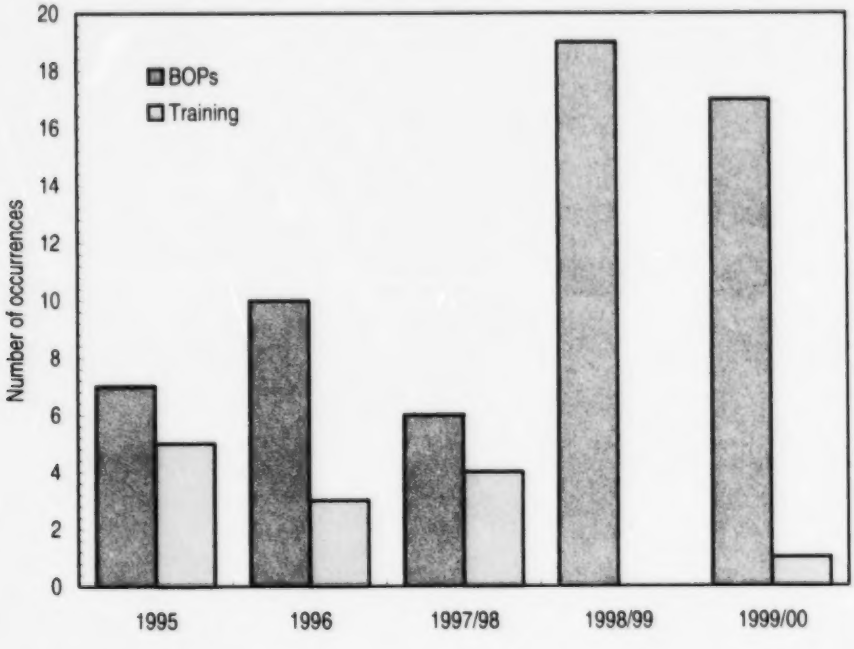

Figure 7. Major deficiencies on service rigs

Servicing operations were suspended at all well sites having major deficiencies. This resulted in 13 rig shutdowns, totalling approximately 20 hours. This compares to 19 rig shutdowns, totalling about 28 hours of shutdowns, last year.

EUB Action

- The EUB will continue to take enforcement action for all unsatisfactory inspections, including suspension of operations with major deficiencies.

2.5 General EUB Action for Drilling and Servicing—Inspection Manual Reviews

Guide 36: Drilling Rig Inspection Manual is currently being revised. The primary focus is to clarify sections of the manual and make it more user friendly. A revised draft of *Guide 36* is expected to be available in fall 2000 for all stakeholders to review.

In July 2000 the EUB will begin a review and rewrite of *Guide 37: Service Rig Inspection Manual.* A revised draft of *Guide 37* is expected to be available in fall 2001 for stakeholder review.

Section 3 Oil Production Facilities

3.1 Introduction

EUB staff spend considerable time on oil facilities that have not produced for long periods. The goal is to have the licensee complete an economic evaluation. If the facility is no longer deemed economical, then the company is required to remove equipment, abandon the well, and complete the necessary rehabilitation of the lease.

In addition, EUB oil production inspectors focus on companies with high minor unsatisfactory rates with the goal to improve their compliance records.

Significant resources are also used to deal with public complaints associated with oil production facilities. Staff work with industry to ensure that proper equipment is in place and regular maintenance occurs to minimize facility upsets that lead to impacts on the public.

Information related to solution gas flaring can be obtained from the EUB's Operations Group. The report is entitled *Upstream Petroleum Industry Flaring Report* for year ending December 31, 1999 (EUB Statistical Series 2000-60B).

3.2 Reduction in Potential Public Liabilities from Suspended and Derelict Facilities

In 1999/2000 EUB field staff focused their efforts on facilities that had not produced for two or more years. They identified 269 such facilities and requested companies to abandon them if they were uneconomical or remove production equipment and complete facility rehabilitation where necessary. Expenditures by industry on these suspended facilities were estimated to be $1.54 million.

The EUB does not record the number of facilities that companies cleaned up on their own as a result of realizing the importance of reducing their environmental liabilities. However, the EUB believes that industry efforts have been significant. For example, some companies proactively evaluate their nonproducing properties; if they find them to be uneconomical, they abandon them and reclaim the lease. The market for used wellhead equipment and casing and production equipment helps to offset the cost of well abandonment and reclamation.

EUB Action

- The EUB will continue to focus on nonproducing facilities and associated pipelines and to request companies to take action to reduce the potential for public liability.

- During 2000/2001 the EUB will review the current process of reducing public liabilities in relation to oil production facilities and will modify it if necessary to ensure effectiveness.

3.3 Companies with Highest Major/Minor Unsatisfactory Inspection Rates

In 1998, field staff started a trial program of tracking a number of companies with poor inspection history. As a follow-up to last year's provincial summary report, there were 15 companies identified as having a poor inspection record based on major unsatisfactory inspections in 1997. A summary of their inspection records

indicates continuous improvement for 1998 and 1999 (see Table 5). These companies have now demonstrated commitment to follow EUB regulations and requirements. All companies with major unsatisfactory inspections will be addressed with the EUB's enforcement ladders in the future.

Table 5. Combined inspection history of 15 companies

Year	No. of inspections	No. of major unsatisfactory	Percentage major unsatisfactory	Provincial average
1997	640	70	10.9	5.1
1998	1239	25	2.0	2.6
1999	1184	14	1.2	2.7

The process to identify companies with a minor unsatisfactory inspection rate that is significantly above the industry average is outlined in EUB *Informational Letter (IL) 99-4: EUB Enforcement Process, Generic Enforcement Ladder, and Field Surveillance Enforcement Ladder*. Based on the 1998 inspection record, the EUB targeted companies (total of eight) that had a minor unsatisfactory rate greater than 58 per cent with at least seven initial inspections at their batteries.

The EUB held meetings with each company to review its 1998/1999 inspection records. Each company then was required to develop an action plan to address minor unsatisfactory conditions at its batteries. The EUB outlined the escalating consequences that would apply if its inspection record did not show significant improvement upon review in April 2000.

In 1998 these eight companies together had 112 initial inspections. Minor unsatisfactory conditions were found at 77 batteries, resulting in a 68.7 per cent unsatisfactory rate. The EUB inspection record review of these eight companies from November 1, 1999, to April 1, 2000, indicated that the EUB conducted a total of 51 initial inspections and found minor unsatisfactory conditions at 18 batteries, resulting in a 35.3 per cent unsatisfactory rate (see Figure 8). Although this is a significant improvement in their EUB compliance rate, additional improvement is still required.

Measures taken by the companies to improve their compliance rate include

- conducting independent third-party inspections at their batteries;
- inspecting each of their batteries using *Guide 45: Battery Inspection Manual* as a reference;
- holding meetings with trucking firms to inform them of the necessity of maintaining a clean operation;
- holding meetings with company personnel and contract operators to ensure that they are aware of EUB requirements; and
- including the company's EUB inspection history in the criteria for setting employee bonuses.

EUB Action

- The EUB will continue to monitor the inspection records of companies with high minor unsatisfactory rates to ensure continued compliance.

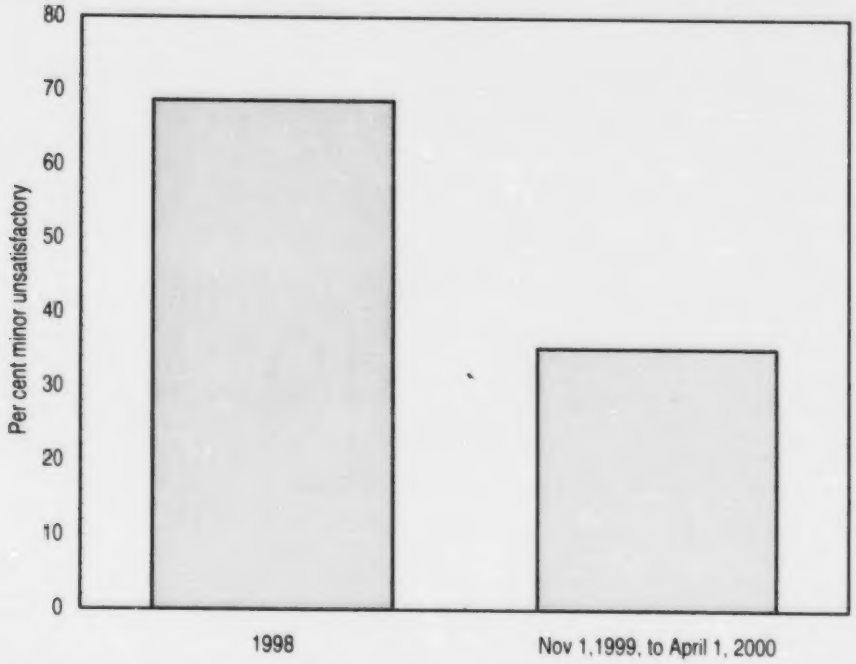

Figure 8. Percentage of minor unsatisfactory inspections for eight target companies

3.4 Public Complaints

During 1999/2000, EUB field centres investigated 104 public complaints related to odours and smoke/flaring at oil production facilities, compared to 92 similar complaints the previous year (see Figure 9).

Each year the EUB also reviews the public complaint history of each oil production facility to determine if there were repeat complaints. If so, EUB staff establish whether additional regulatory or industry action is required to effectively achieve lasting improvement.

In the 1999/2000 reporting year, 12 oil facilities were identified with repeat public complaints, which were related to odours, smoke/flaring, noise, spills, and lease management. This is a significant reduction from the previous year, when 31 oil facilities were identified as having repeat complaints. This reduction can be attributed in part to the EUB Field Surveillance Enforcement Ladders, whereby specific enforcement action is required in cases of noncompliance. In 1999/2000 the EUB suspended production at 65 oil batteries due to noncompliance, mainly for odours off lease and unattended spills on and off lease.

EUB Action

- The EUB will follow up to ensure that operators investigate sources of emissions, install new equipment using new technologies to reduce emissions,

and keep area residents informed of operational problems that may have an impact on them.

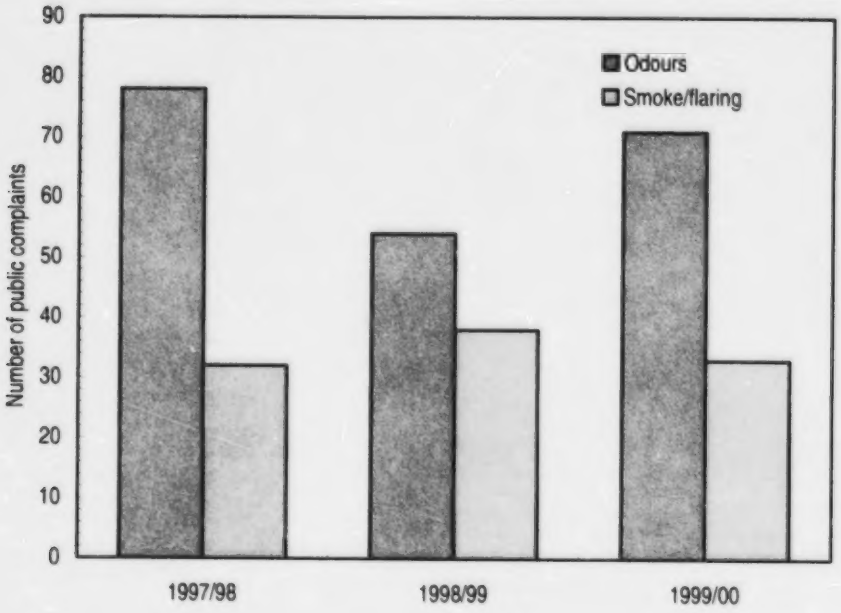

Figure 9. Oil production—odour and smoke/flaring complaints

- The EUB will continue to monitor industry to ensure they are reducing the number of repeat complaints. Industry is expected to immediately address problems and prevent similar occurrences at their facilities throughout the province.

3.5 Inventory, Activity Level, and Inspections

The current inventory of conventional oil and crude bitumen batteries/satellites is as follows:

- sweet multiwell 1530
- sour multiwell 618
- sweet single well 7752
- sour single well 1214
- sweet satellites 2216
- sour satellites 1304

Figure 10 shows the inventory of oil batteries and associated satellites, the number of initial battery/satellite inspections, and the percentage found to be unsatisfactory for the years 1995 to 1999/2000. Approximately 64 per cent of initial battery/satellite inspections conducted in 1999/2000 were satisfactory. Figure 11 shows the percentage of battery/satellite inspections that found major unsatisfactory items on initial inspections and reinspections.

EUB *Guide 64: Facility Inspection Manual* outlines possible major unsatisfactory conditions that would be identified during an EUB inspection of batteries and satellites.

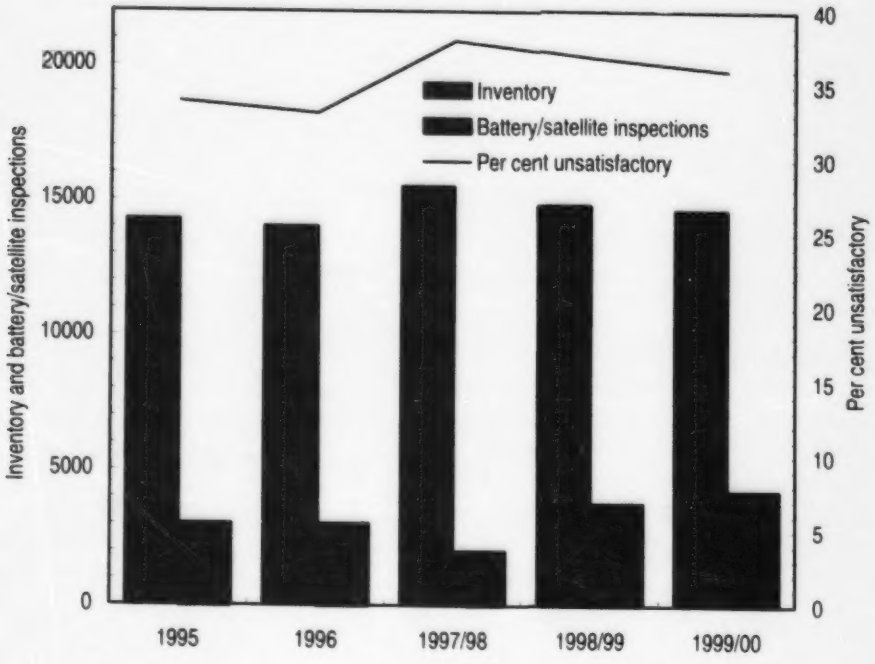

Figure 10. Inventory, battery/satellite inspections, and percentage unsatisfactory based on initial inspections

Using the OSI[8] priority inspection process, EUB staff conducted 5590 battery and satellite inspections (including 1346 reinspections) in 1999/2000. The increase in the number of inspections from 5130 inspections last year can be attributed in part to the EUB's focus on suspended facilities that have not produced for two or more years and facilities that have not been inspected in the past five years.

Major unsatisfactory conditions were found in 127 of 5590 inspections (2.3 per cent) in 1999/2000. In addition, there were 3 serious unsatisfactory inspections. In 1999/2000, 65 oil production facilities were suspended as a result of major and serious unsatisfactory inspections. Appropriate enforcement action was taken on the remaining to bring the facilities into compliance. This compares with 137 major unsatisfactory conditions identified in 5130 inspections (2.7 per cent) in 1998/1999.

The three most common major unsatisfactory items found in 1999/2000, shown in Figure 12, were

- H_2S emissions off lease
- storage requirements: inadequate secondary containment installed
- repetitive or existing spills that were not being cleaned up

[8] As stated earlier, the EUB does inspections based on priority selection criteria that include **operator**/ contractor performance history, site **sensitivity**, and **inherent** risk of the operation (OSI).

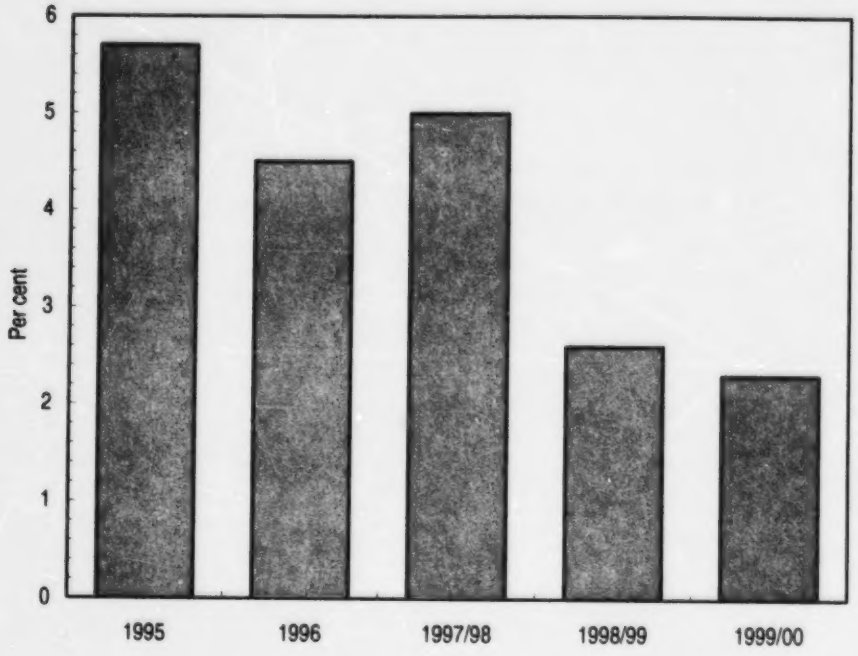

Figure 11. Battery/satellite inspections with major unsatisfactory items based on initial inspections and reinspections

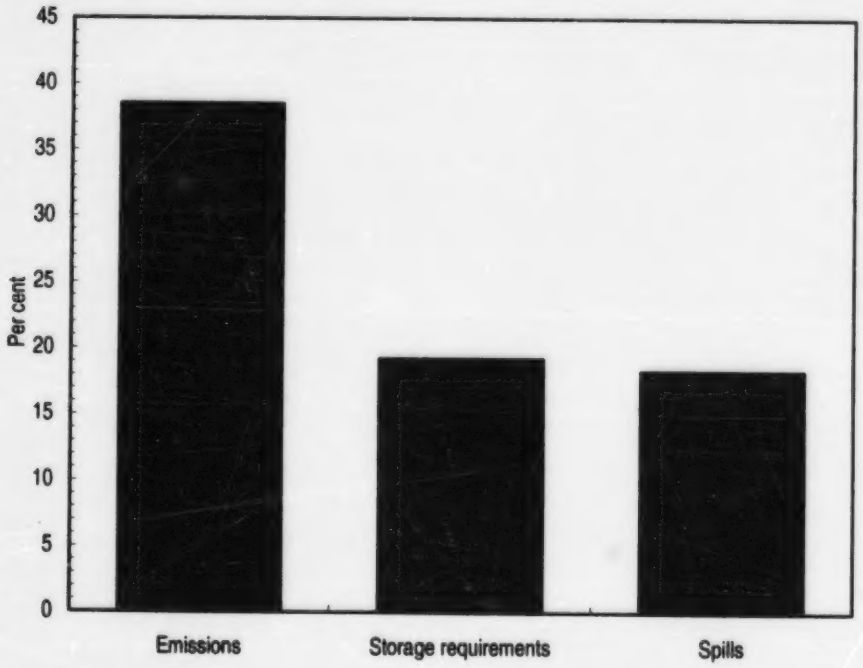

Figure 12. Oil facilities' three most common major unsatisfactory items, 1999/2000

EUB Action

- Major unsatisfactory inspections will be dealt with as outlined in *IL 99-4*. Consequences include suspension of operations if necessary to alleviate impact; company instructed to take corrective action at subject site and ensure compliance at all similar facilities that it operates provincially; documented action plan required to ensure that the issue or event does not recur or is minimized.

EUB *Guide 64: Facility Inspection Manual* outlines possible minor unsatisfactory conditions that would be identified during an EUB inspection of batteries and satellites.

Minor unsatisfactory conditions were found in 1407 of the 5590 inspections (25.2 per cent) in 1999/2000. All unsatisfactory conditions were addressed by industry. This compares with 1334 minor unsatisfactory conditions in 5130 inspections (26.0 per cent) in the previous year. The most common minor unsatisfactory items found in 1999/2000, shown in Figure 13, were

- housekeeping
  - garbage or loose debris not being stored in a reasonable manner
  - oil-stained areas on lease not cleaned up
- signage/security
  - no identification or warning signs posted
  - fencing not adequate where required
- measurement
  - meter calibration expired

EUB Action

- Minor unsatisfactory inspections will be dealt with as outlined in *IL 99-4*.
- Companies that clearly exceed the minor unsatisfactory industry average will be required to submit a written action plan to address noncompliant items at all similar facilities they operate provincially. If future EUB inspections indicate that they continue to exceed the minor unsatisfactory industry average, consequences may be elevated to third-party inspections at the company's expense and/or full or partial suspensions, as directed by the EUB.

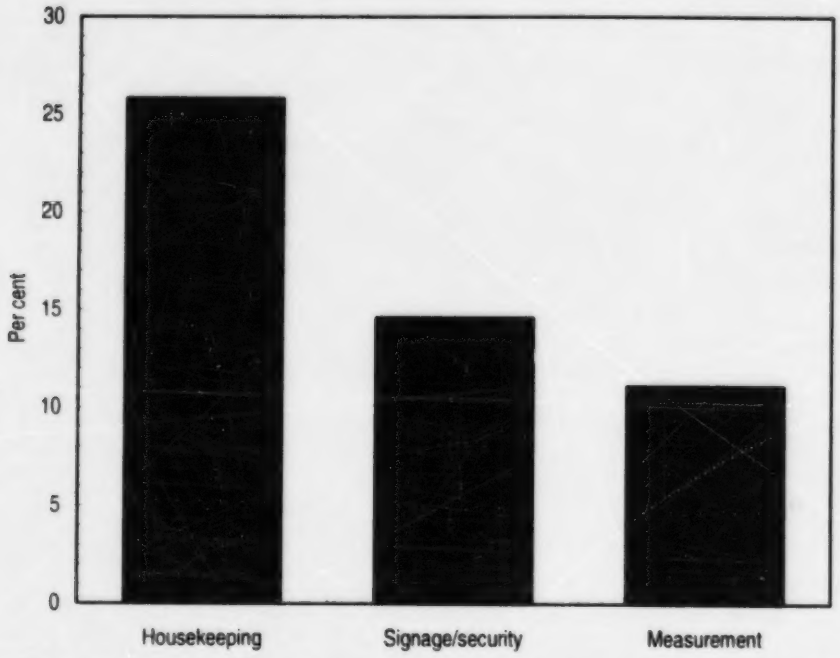

Figure 13. Oil facilities' three most common minor unsatisfactory items, 1999/2000

Section 4 Gas Production

4.1 Introduction

The EUB's gas plant operational audit team focuses on environmental and public safety issues, verifying industry's understanding of and compliance with regulatory requirements and public expectations. Sixty-five operational audits of sulphur recovery facilities, straddle plants, and acid gas flaring plants have been completed since 1996, including 25 in 1999/2000. Of the 65 audits completed, 2 facilities received major unsatisfactory inspections and 26 received minor unsatisfactory inspections.

In 1998 the EUB requested 8 action plans from companies with gas processing facilities exceeding the 0.5 per cent yearly flaring allowable. Operational problems and production accounting and measurement errors were the most common problems associated with reporting excessive plant flaring. A review of the 1999 flaring reports indicated that these 8 facilities have reduced their reported flare volumes by 16 840 $10^3 m^3$ from the previous year and are now in compliance.

EUB staff spend considerable time attempting to resolve public concerns related to proposed and existing gas production facilities. Staff involvement in open houses, information sessions, community meetings, and synergy groups helps alleviate public concerns and improve industry's awareness of the impact their facilities have on surrounding residents.

4.2 Inventory, Activity Level, and Inspections

Continued record activity levels in the natural gas industry resulted in an increase of 4794 new producing gas wells in 1999/2000. At year-end, there were 49 809 producing gas wells in Alberta.

The number of gas plants has remained relatively constant over the last five years, as shown in Figure 14. At year-end, 423 sweet gas plants and 236 sour gas plants were operating in the province, including 47 sulphur recovery facilities and 25 sour gas plants with acid gas injection schemes.

The number of gas batteries has increased significantly since 1995. The majority of new gas production in 1999/2000 was tied in to existing pipelines and processing facilities.

Field staff completed 627 initial inspections of gas processing plants and gas batteries in 1999/2000 (see Figure 15). Of those, 402 (64.1 per cent) of inspections were satisfactory and 225 (35.9 per cent) were unsatisfactory. While there were inspections conducted on the facilities of 191 companies throughout the year, about 61 per cent of all inspections were directed at 22 companies.

EUB Action

- The EUB will continue to maintain its gas facility inspection levels as necessary to achieve continued improvement in compliance levels.

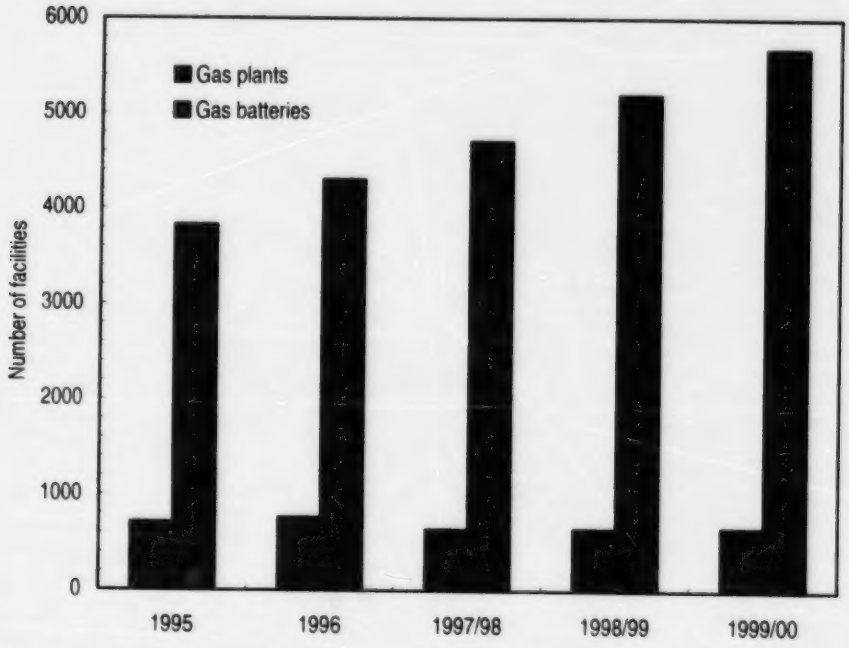

Figure 14. Number of gas facilities

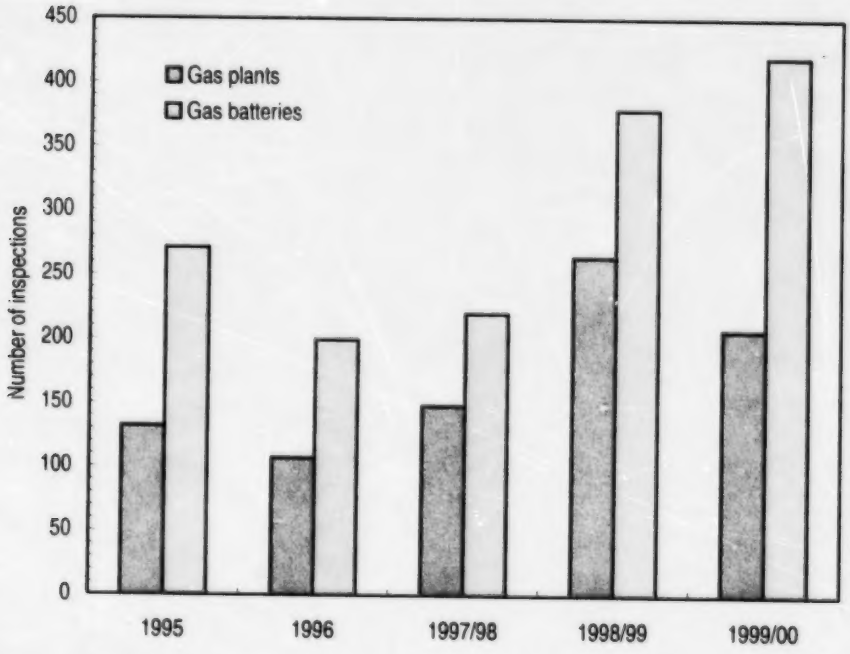

Figure 15. Gas production—inspections

4.3 Problem Areas and Response

The unsatisfactory inspection rate at gas plants remained relatively constant as compared to last year, while the rate decreased at gas batteries from approximately 47 per cent in 1998/1999 to 34 per cent in 1999/2000 (see Figure 16). The percentage of satisfactory follow-up inspections also decreased during the year; however, it remains high, as reflected in Figure 17.

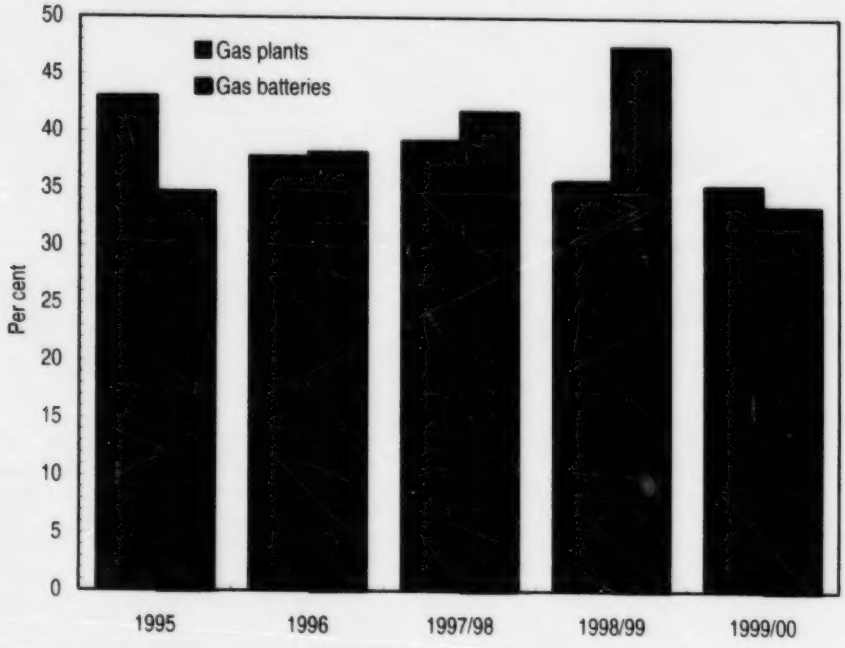

Figure 16. Gas production—unsatisfactory initial inspections

The total number of public complaints related to gas production facilities (gas plants and compressor stations) increased from 101 in 1998/1999 to 116 in 1999/2000, as seen in Figure 18.

The impact gas production facilities have on the public continues to be a concern to the EUB. Fugitive emissions, noise from natural gas compressors, and flaring and black smoke are the primary issues affecting the public.

Sulphur recovery efficiencies at gas plants recovering salable sulphur increased from 98.7 per cent in 1998/1999 to 98.8 per cent in 1999/2000, as reflected in Figure 19. Despite an increase in sulphur production of approximately 4 per cent, overall sulphur emissions decreased by 0.3 per cent in 1999/2000.

The EUB, in conjunction with Alberta Environment, is currently reviewing the existing sulphur recovery guidelines (*IL 88-13: Sulphur Recovery Guidelines – Gas Processing Operations*). The review will update and clarify the sulphur recovery requirements for grandfathered sour gas plants, as well as other types of sour gas facilities.

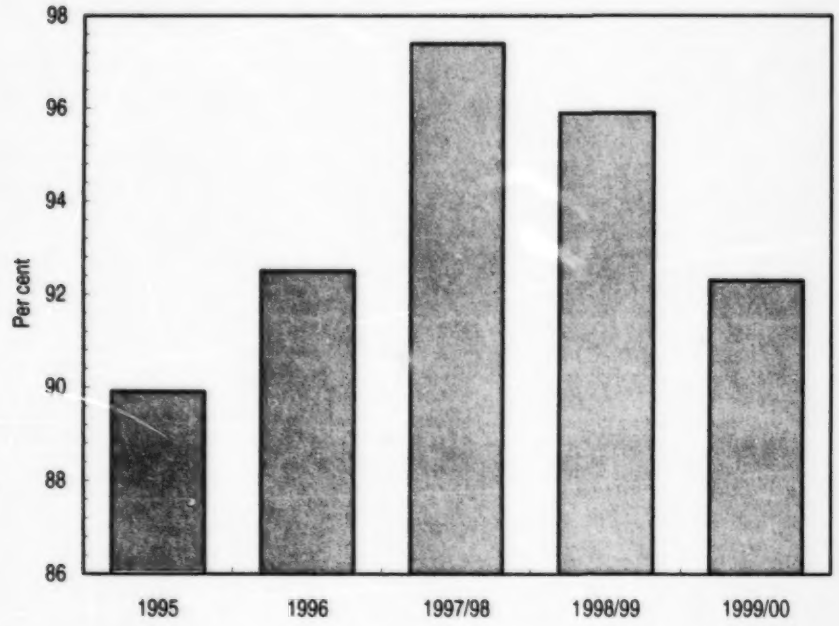

Figure 17. Gas production—satisfactory follow-up inspections

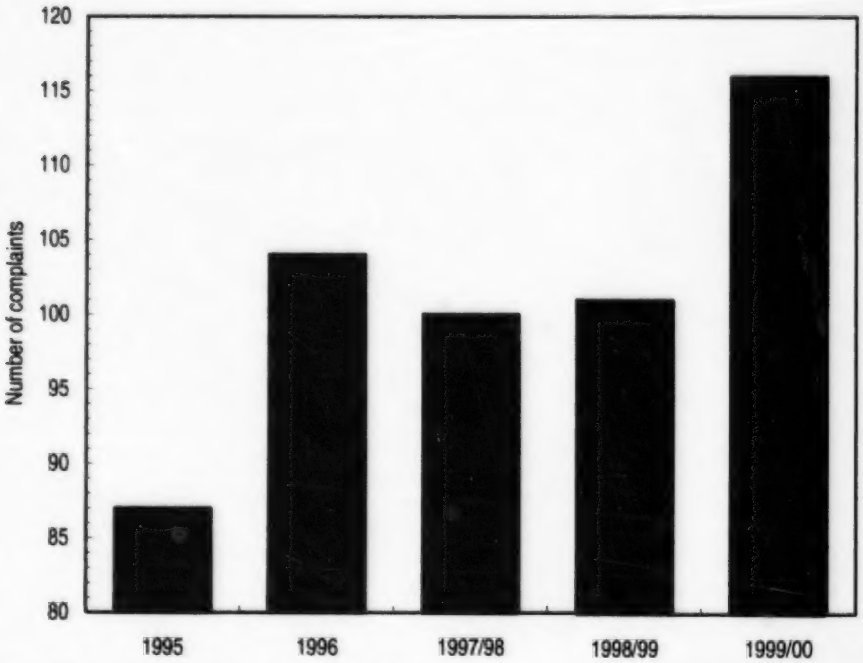

Figure 18. Gas production—total complaints

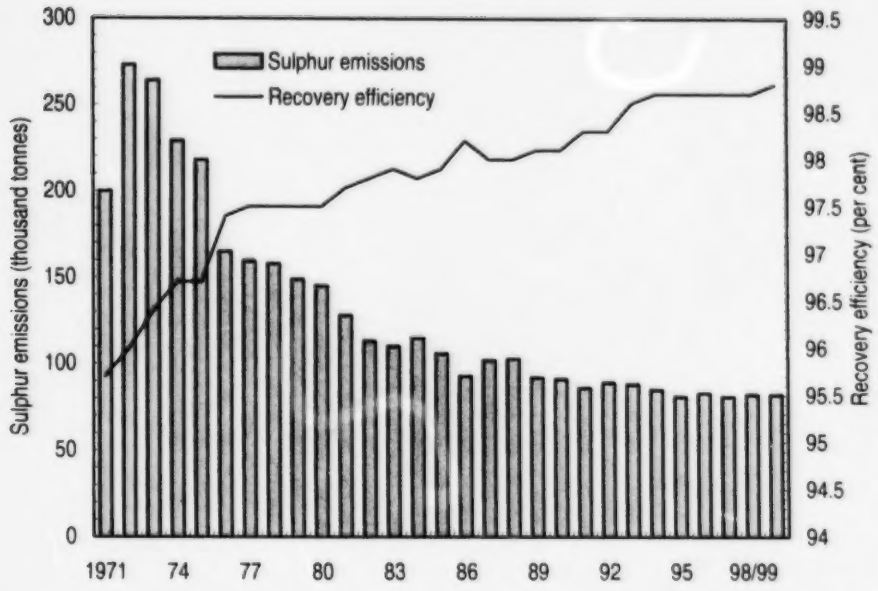

Figure 19. Efficiency versus emissions of sulphur recovery plants

Unsatisfactory inspection items are classified as either minor/major or serious for the purpose of judging the severity of deficiencies to determine appropriate enforcement and follow-up actions. Major unsatisfactory inspections having the potential to cause an adverse impact on the public or the environment accounted for 4.0 per cent of all gas facility inspections completed during the year. EUB staff suspended 11 facilities with major unsatisfactory inspections in 1999/2000 until improvements were made to ensure that the facilities operate with minimal impact.

Noncompliance with storage requirements, unaddressed hydrocarbon spills, and severe sour gas emissions were the most common major deficiencies, as shown in Figure 20. Gas measurement problems, poor housekeeping practices (hydrocarbon staining), and improper signage accounted for 60 per cent of all minor deficiencies recorded during the year.

EUB Action

To improve industry compliance levels and minimize the impact of gas production facilities on the public and the environment, the EUB has implemented the following key strategies.

- The EUB will continue to use a priority inspection selection process focusing on companies with a noncompliant inspection history and facilities having the greatest potential to impact the public or the environment. Inspections are prioritized based on operator performance, site sensitivity, inherent risk, and inspection frequency.

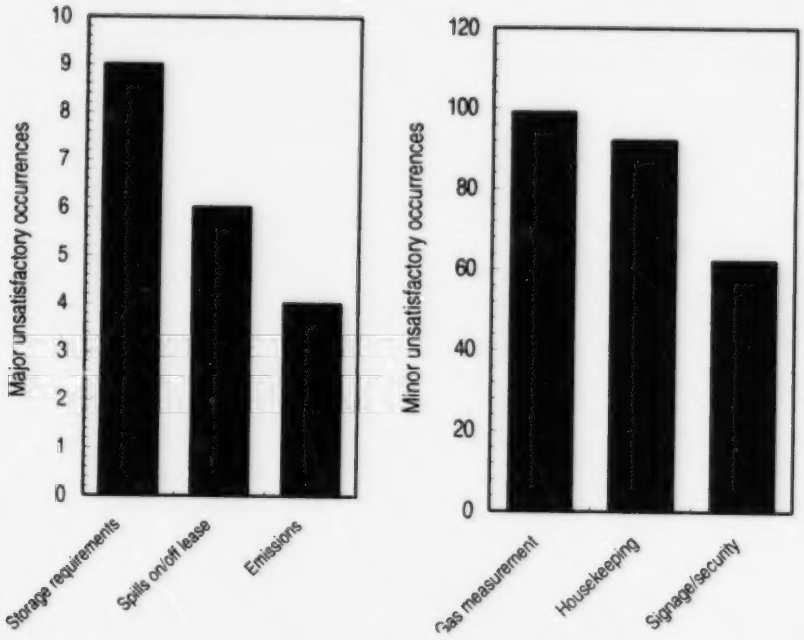

Figure 20. Gas production— most common major/minor unsatisfactory occurrences, 1999/2000

- In 1996 the EUB developed a provincial inspection program to integrate a general plant inspection with a more detailed assessment of environmental and related public issues. Emergency response preparedness, flare measurement and control, waste management practices, equipment integrity practices, and corrosion monitoring and inhibition are just some of the items reviewed through the audit process. This integrated approach will continue in the future.

- Public complaints have increased from last year. With the implementation of the new flaring guidelines (*Guide 60*), the EUB will work closely with CASA, industry, and the public to address these concerns.

- The EUB initiated a gas plant flare surveillance program in 1998 to encourage industry to reduce flaring at gas processing facilities. As part of the process, companies with gas plants flaring more than 0.5 per cent of the total annual volume delivered to the plant were required to submit a plan outlining actions for reducing flare volumes. This process to reduce flare volumes was successful in 1999/2000 and will continue.

- The EUB issued the new *Guide 64: Facility Inspection Manual* to ensure that staff inspect oil and gas production and processing facilities in a consistent manner throughout the province. It is hoped that through this manual, industry will gain a greater understanding of EUB requirements and, when necessary, take appropriate actions to improve their operational practices. The manual defines satisfactory and minor/major/serious unsatisfactory inspection results, as well as consequences for noncompliance in accordance with the EUB's Field Surveillance Enforcement Ladder.

Section 5 Pipeline

5.1 Introduction

The Field Surveillance Pipeline Team focuses its inspection activities on four key areas:

1) **Pipeline failure incidents**—The Alberta Pipeline Act requires all licensees of pipelines to report any pipeline failures to the EUB regardless of cause, magnitude, or consequence. Staff verify cause of failures and ensure that measures are taken to reduce failures on pipeline systems.

2) **Construction and testing inspections**—A percentage of new pipeline installations are inspected for compliance with appropriate codes, acts, and regulations.

3) **Operations inspections**—Staff conduct inspections on licensed systems to ensure that operators meet records and maintenance requirements for continuous pipeline integrity.

4) **Contact damage**—Staff hold awareness seminars for operators and contractors to reduce incidents of pipeline hits, enhance public safety, and reduce environmental impacts.

The EUB has jurisdiction over a pipeline infrastructure encompassing over 276 500 km in Alberta. EUB pipeline inspections focus on improving public safety and reducing public impacts and public liabilities. Table 6 identifies the pipelines constructed each year since 1988 by category.

Table 6. Length of pipelines constructed by type in Alberta under EUB jurisdiction (yearly lengths, in km)[1]

Year	Crude oil	Natural gas	Sour gas	Water	Multiphase	Others	Total
Up to 1988	10 940	83 916	4 707	10 874	25 926	13 249	149 612
1989	316	4 136	770	436	1 577	697	7 932
1990	180	5 172	423	575	1 141	938	8 429
1991	578	3 763	261	548	1 155	374	6 679
1992	538	3 549	185	475	1 159	381	6 287
1993	454	6 265	390	634	1 864	703	10 310
1994	141	3 831	185	464	1 210	232	6 063
1995	604	10 967	762	946	2 277	771	16 327
1996	418	7 683	1 188	655	1 979	900	12 823
1997	819	9 323	1 154	787	2 183	1 897	16 163
1998	1 146	12 933	2 392	982	2 757	1 401	21 611
1999	712	8 871	1 394	501	1 207	1 610	14 295
Total	16 846	160 409	13 811	17 877	44 435	23 153	276 531
Percentage of total length constructed, by category	6.1%	58.0%	5.0%	6.5%	16.1%	8.4%	

[1] Numbers were calculated by adding all statuses (operating, permitted, abandoned, discontinued, and suspended) for all types.

5.2 Pipeline Failure Incidents

A pipeline failure is defined as "the failure of the pipeline to contain the substance being transported"; for statistical purposes, it is designated as either a leak or a rupture. If a pipeline failure occurs, the licensee or operating company is required to inform the local EUB field centre. An EUB field representative logs the information into a database, which includes date of occurrence, geographic location, pipeline specifications, operating conditions, environment or spill details, and one of the cause categories shown here:

Corrosion Causes	**External Forces**	**Weld Causes**
Internal corrosion	Construction damage	Weld failure
External corrosion	Damage by others	Seam ruptures
Weld corrosion	Earth movement	Pipe failure
	Mechanical damage	
Joint Causes	**Equipment Causes**	**Other Causes**
Joint failure	Fitting/valve failures	Overpressure
Mechanical joint	Installation failures	Operator error
Girth weld		Miscellaneous
		Test failure
		Unknown

Depending on the circumstance of the failure, EUB field inspection staff may require the operating company to perform analysis on the pipeline system to prove integrity and mitigate further occurrences. For the reporting period of April 1, 1999, to March 31, 2000, EUB field centres recorded 950 pipeline incidents and staff conducted 437 inspections, primarily focusing on corrosion-related failures. Figure 21 indicates the causes of pipeline failures for 1999/2000. All failure incidents are reviewed with the companies at the time of notification. As a result of the failures, industry was required to do the following work:

- undergo requalification testing (total of 636, with 33 failing during requalification)
- submit failure mechanism reports (329 requested to establish mechanism of failure)
- amend licences (153 amendments to replace or internally line the pipe with a new corrosion barrier or to abandon)
- other (161)
  - upgrade system mapping of pipelines, identifying outside diameter and product velocities
  - conduct analysis of product shipped
  - conduct analysis of product received
  - inject corrosion inhibitors
  - install filtration system to remove solids
  - carry out internal smart pig inspections
  - conduct cathodic protection surveys
  - install pigging facilities
  - conduct risk assessments (e.g., pipeline and environmental)

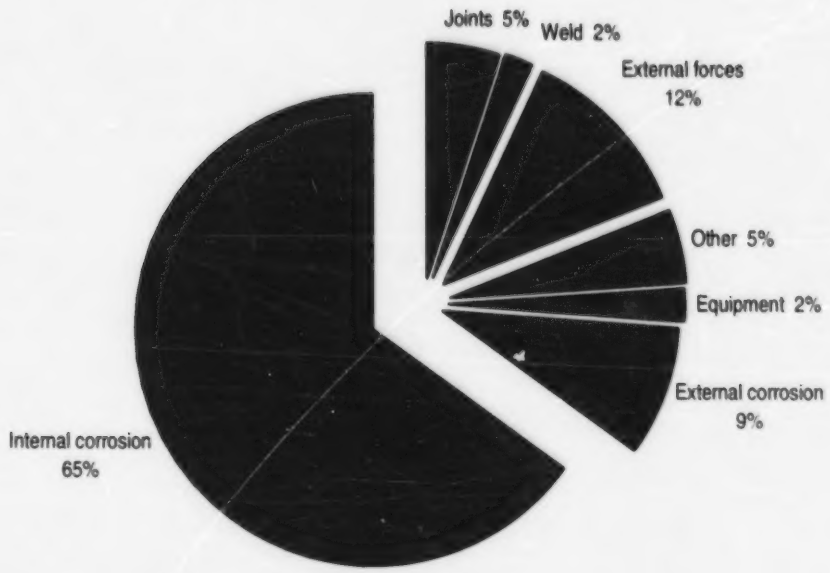

Figure 21. Pipeline failures by cause, 1999/2000

The pipeline industry is represented by

- Canadian Association of Petroleum Producers (CAPP)
- American Society of Mechanical Engineers (ASME)
- National Association of Corrosion Engineers (NACE)
- Canadian Centre for Materials and Energy Technology (CANMET)
- Canadian Energy Pipeline Association (CEPA)

These organizations contribute considerable resources towards the reduction of failure incidents. Regional, national, and international pipeline conferences and workshops are held annually.

As these groups share technology and information, their success is being demonstrated in the field through reduced numbers of failures. Analysis of historical data for failure frequency of Alberta pipelines or for number of failures per 1000 km of pipelines indicates a 35 per cent reduction in failures from 1988 to 1999 over the 11-year period (see Figure 22).

EUB Action

- The EUB will focus its attention on the corrosion aspect of pipeline failures to ensure that failures are minimized. An increase in inspection coverage on corrosion-related failures in 2000/2001 will result.

- The EUB will continue to analyze failure causes and ensure that measures are put in place to prevent recurrences in the entire pipeline system and not just the line segment that failed.

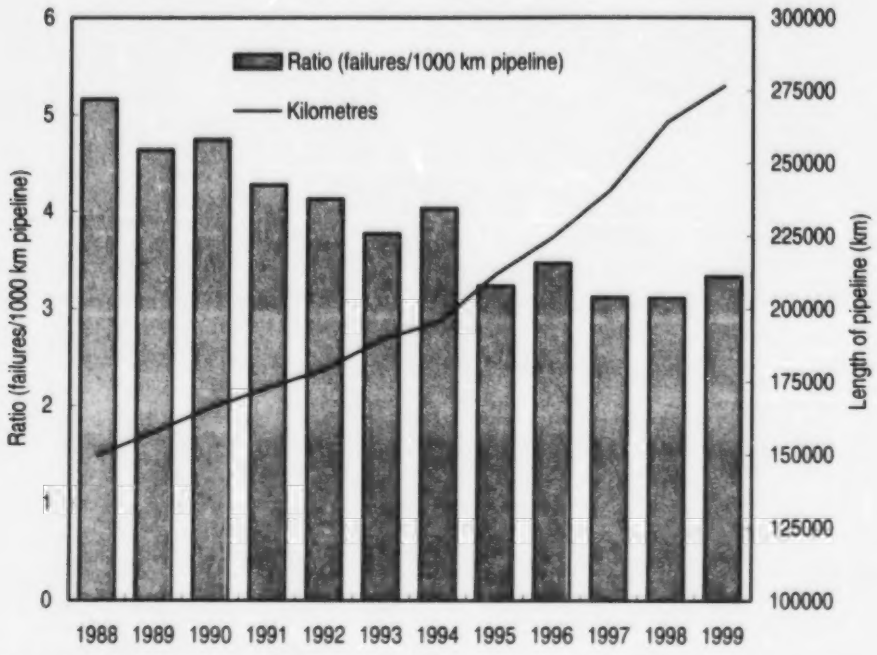

Figure 22. Overall failure incidents compared to total pipeline length

5.3 Construction and Testing Inspections

Provincially EUB field staff inspected 214 companies for a total of 379 pipeline construction/testing inspections in 1999/2000, with 79 per cent satisfactory inspections. The unsatisfactory inspections include

- 2 serious: improper ground disturbance procedures, resulting in contact damage to foreign lines
- 3 major: one line not built to sour service requirements (e.g., 100 per cent radiograph not performed); two lines used improper exposing techniques at foreign crossings
- 76 minor: application amendments were required to reflect proper approval information (e.g., pipe size, wall thickness, grades of pipe, and alignment to and from locations); note that in all cases materials used exceeded requirements

Of the inspections conducted, 20 per cent found minor deficiencies with the pipeline applications and 5 of the 379 inspections warranted temporary or partial suspension enforcement action.

EUB Action

- The EUB will continue to ensure that industry is aware of regulatory requirements and the consequences of not meeting these.

5.4 Operations Inspections

In 1999/2000 EUB surveillance staff conducted inspections of 69 companies and inspected 376 different systems (including 45 reinspections) to check their ongoing maintenance requirements for continuous pipeline integrity. These are two-part and very detailed inspections, involving a field inspection of the system(s) and a records check of maintenance documentation. The inspection results indicated 135 satisfactory inspections, 31 inspections with major unsatisfactory items, and 210 inspections with minor unsatisfactory items.

Among the 31 major unsatisfactory items, 17 were field related and 14 related to record keeping. Field items included no internal corrosion monitoring or mitigation and no cathodic protection installed. Of 210 minor unsatisfactory items, 90 were field related, while 120 related to record keeping. Items included problems with record updates and pipeline warning sign maintenance. Appropriate enforcement action was taken to bring the pipeline systems into compliance.

EUB Action

- EUB surveillance staff will continue to review operator/licensee operations in 2000/2001 to ensure safe operation procedures and maintenance.

5.5 Contact Damage

The goal of this inspection area is prevention of pipeline damage (hits). If a company does not follow ground disturbance regulations, the EUB will impose enforcement guidelines for noncompliance, as detailed in *IL 99-4: EUB Enforcement Process*. There were 68 contact damage incidents recorded for 1999/2000, the lowest incident rate for the past five years (see Figure 23). EUB field staff inspected 42 worksites and presented 21 ground disturbance seminars to companies in violation. EUB staff presented 57 seminars for educational purposes, with approximately 1470 people from industry and the public in attendance.

In addition to the EUB, other organizations work diligently to prevent pipeline and utilities damage as well. Of particular note is the Edmonton Area Pipeline and Utilities Operators' Committee (EAPUOC), which organizes and facilitates communication among owners of buried pipelines, utility installations, emergency responders, and regulators in the event of an emergency. Each year EAPUOC organizes an emergency training exercise and a safety seminar for the general public and industry.

EUB Action

- The EUB will continue to focus on educating parties that have been involved in pipeline hits in an effort to reduce the potential for future incidents.

5.6 General EUB Action on Problem Areas

EUB Field Surveillance pipeline staff have identified the following four key focus areas for 2000/2001.

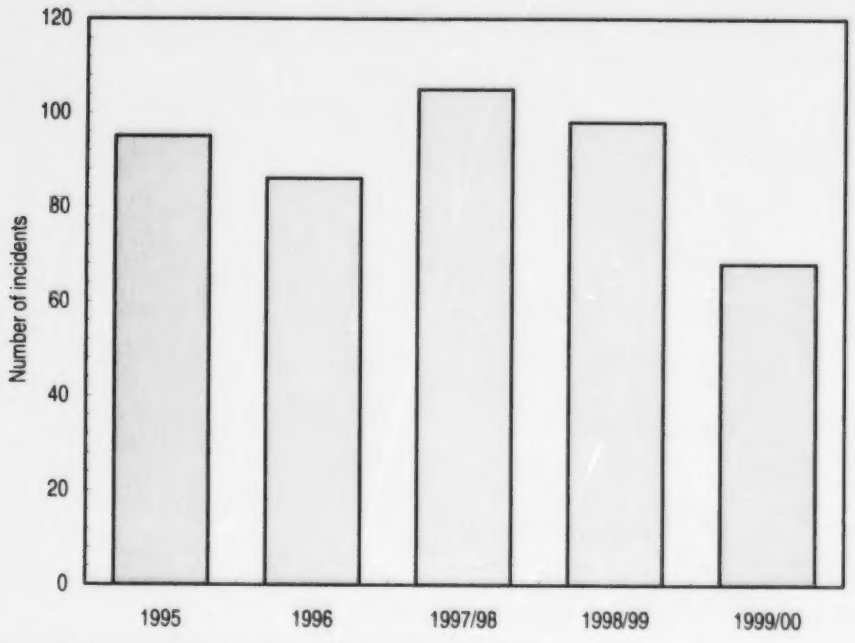

Figure 23. Pipeline contact damage incidents in Alberta

1) Pipeline Failure Incidents

Corrosion continues to be an area of focus due to the number of line or system failures. As part of the EUB process to investigate failures, a lab analysis of the failed pipe segments with no previous inspection history is required. Companies must implement recommendations from these assessments to mitigate future occurrences of corrosion.

The EUB will perform pipeline integrity program reviews during operation inspections to verify their effectiveness.

The Pipeline Regulations adopted *CSA Z662-96*, Appendix E, as a mandatory requirement for leak detection on liquid pipelines in *General Bulletin (GB) 98-14: Pipeline Amendment Regulations*. These changes result in one standard regarding leak prevention and detection for liquid pipelines in Alberta. (For more information on pipeline performance in Alberta, see EUB *Report 98-G: Pipeline Performance in Alberta, 1980-1997.*)

2) Construction and Testing Inspections

EUB field staff will continue to inspect new systems being constructed to ensure compliance with pipeline codes and regulations.

3) Operations Inspections

The EUB will place emphasis on safe operating procedures and maintenance for continuous pipeline integrity. The number of discontinued and decommissioned lines identified during operation inspections has led the EUB Pipeline Team to focus on this area. The liability of decommissioned pipeline facilities is of concern because non-core properties are disposed of during divestitures and restructuring.

Another area of concern is operators' failure to submit licence transfers and amendments. This results in inaccurate pipeline data as to ownership, signage, emergency contacts, and operation status and weakens overall integrity of pipeline systems. EUB staff will focus on rectifying these problems.

4) Contact Damage (Hits)

The EUB will increase emphasis on site inspections. Staff will continue to conduct seminars for high-risk groups involved in ground disturbance activities to educate workers about requirements and safety issues associated with their work. This will improve workplace safety, reduce the potential for public injury, and improve public confidence.

Section 6 Environment

6.1 Introduction

Field Surveillance's goal is to minimize the effects of spills regardless of where they occur. To ensure the most efficient and effective response, Alberta Environment (AENV) and the EUB have a memorandum of understanding that outlines each agency's responsibilities when a spill occurs. EUB *Informational Letter (IL) 98-1: Memorandum of Understanding between Alberta Environmental Protection and Alberta Energy and Utilities Board* details these roles and responsibilities with respect to coordination of release notification requirements and subsequent regulatory response.

As mentioned in Section 1.4 of this report, the EUB receives a number of odour complaints. In addition to the measures to address these problems discussed in that section, the Field Surveillance group also uses an ambient air monitoring unit to track and assess potential fugitive emissions. This unit is capable of performing mobile or stationary monitoring and can detect ambient levels of hydrogen sulphide and sulphur dioxide in parts per million.

The EUB is also involved in the regulation of waste management facilities and drilling waste disposal. Both of these areas have been a major area of focus for the Field Surveillance group in the last two years. The EUB has developed inspection manuals for each and feels strongly that through education and understanding, industry will improve its operations regarding upstream waste handling.

6.2 Spills and Releases

6.2.1 Total Spills and Releases

The ideal would be to eliminate all spills, and measures are being taken towards this. However, as long as spills do occur, the EUB's goal is to minimize the effects of spills and releases by working cooperatively with industry and other regulators. When a spill or release does occur, the focus is to mitigate any impacts on humans, animals, and the environment. In addition, releases must be reported to the EUB in accordance with *IL 98-1* to allow for an appropriate, timely, and effective response. It is also important to note that more than 70 per cent of the spills are small volume and are usually contained on lease.

The EUB's use of a release reporting and inspection priority system ensures consistent and effective inspections of release events:

- Priority 1 releases pose the threat of serious environmental and public impacts and are responded to immediately in most cases by an EUB inspector; however, in situations where it is virtually impossible for an EUB inspector to respond immediately, all attempts are made to have another regulatory agency respond. In such cases, the EUB then responds as soon as possible. One hundred per cent of priority 1 releases are inspected.

- Priority 2 releases are generally mid- to high-volume releases but can include low-volume spills where the operator is new or has a poor response history. These releases are generally responded to within 2 to 10 working days.

- Priority 3 releases are generally low-volume spills but could include higher-volume spills where the operator history is good. In such cases, the EUB has a high degree of confidence that the release will be appropriately handled. Approximately 25 per cent of priority 3 spills are inspected.

A five-year comparison of the number of liquid spills is provided in Figure 24. As shown, in 1999/2000 a total of 1318 releases were reported to the EUB's eight field centres, a decrease from 1354 similar releases in the previous year. Of those,

- 42 were priority 1 (3 per cent),
- 346 were priority 2 (26 per cent), and
- the remaining 929 were priority 3 (71 per cent).

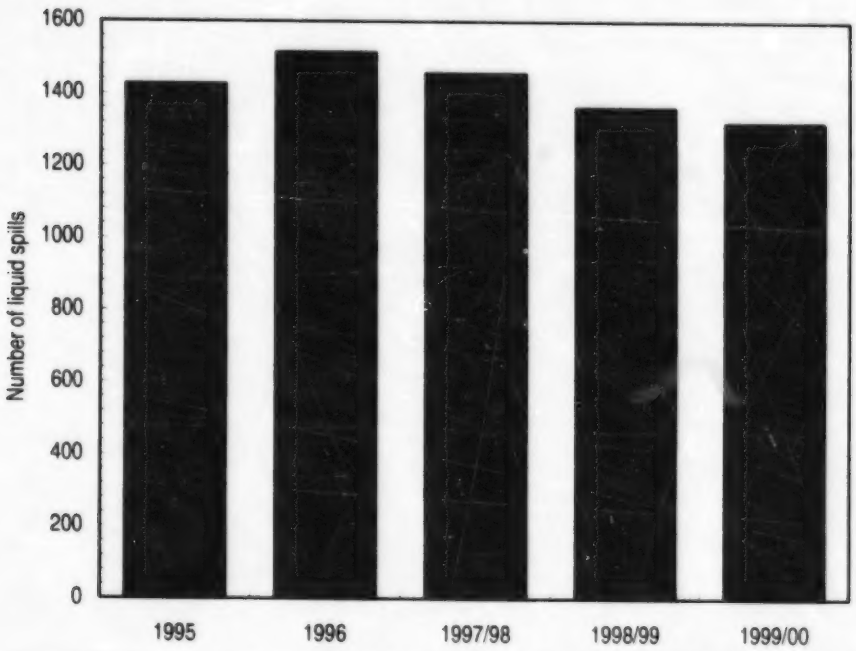

Figure 24. Number of liquid spills from pipelines and other upstream oil and gas sources

EUB Action

- The EUB believes that many liquid spills can be reduced by improving maintenance and corrosion control programs and continues to work with industry towards that goal.

6.2.2 Main Causes of Releases

Corrosion, equipment failure, and operator errors were the leading causes of liquid releases in 1999/2000. Sources in the "other" category included trucks, trucking facilities, central treating facilities, and drilling waste sumps. Figure 25 shows the most significant

sources and causes and indicates that industry must be more effective with its preventive maintenance programs to address corrosion and equipment problems.

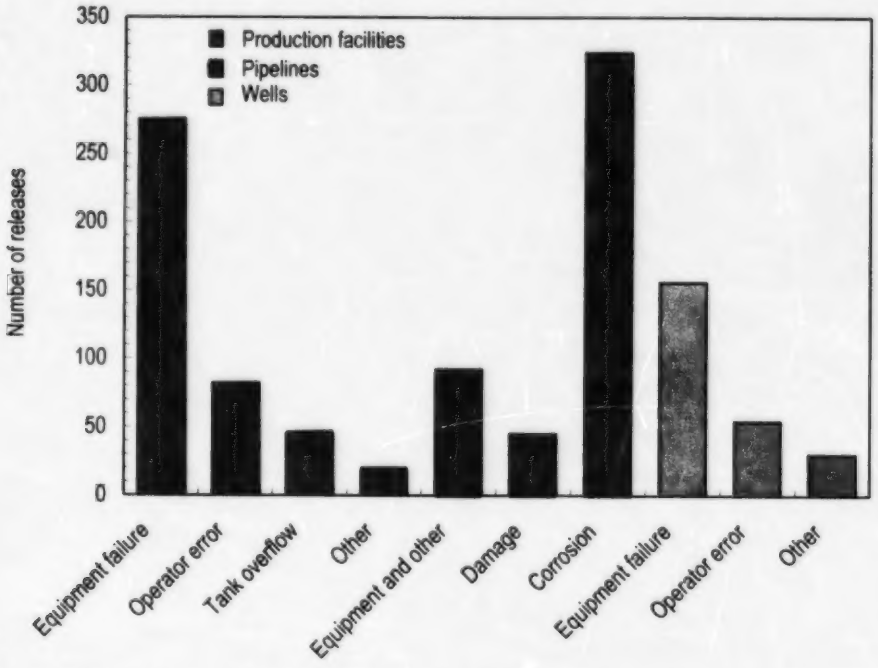

Figure 25. Liquid releases by source and cause, 1999/2000

Figure 26 provides the volume of oil and produced water spills over a five-year period. The spill volumes have remained relatively constant with last year's.

6.2.3 Prevention

The EUB believes that oil spill response training exercises ensure that industry personnel are adequately trained to effectively respond to spills and therefore minimize the impact on the environment and the public.

In 1999/2000, EUB staff attended 17 oil spill cooperative training exercises and, upon request by the oil spill cooperatives, gave presentations on such topics as

- release statistics,
- release reporting requirements, and
- regulatory changes and updates.

Such presentations have a provincial focus but are also tailored to address local issues and concerns. Field staff received positive feedback regarding their involvement and accordingly will continue to participate.

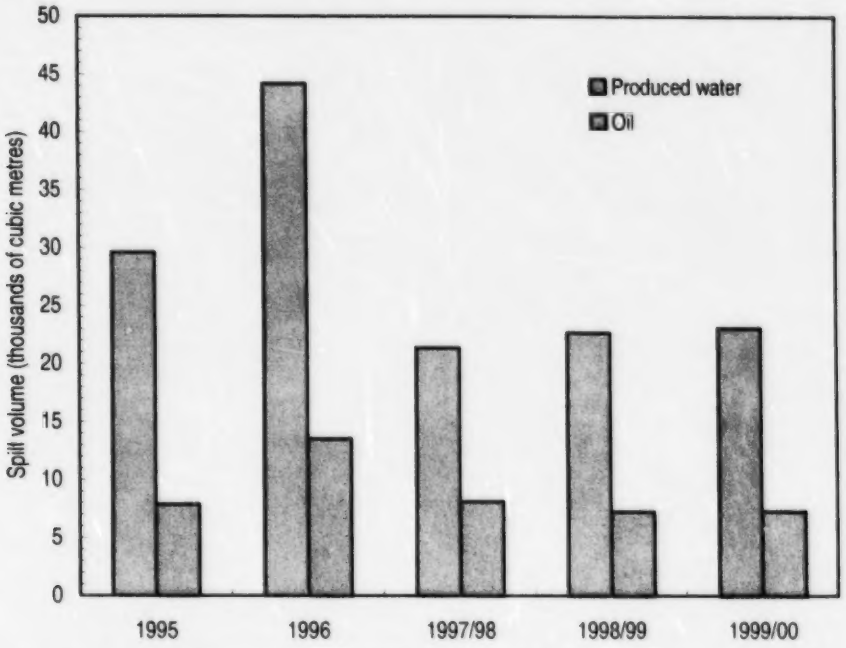

Figure 26. Reported volumes of oil and produced water spills

EUB Action

- By tracking the causes of spills, industry and the EUB can focus on areas that require the greatest attention.
- The EUB welcomes the opportunity to participate in future oil spill exercises and is available to present information to individual companies.

6.3 Mobile Ambient Air Quality Monitoring

6.3.1 The EUB's General Approach to Monitoring

EUB field staff operate a mobile ambient air quality monitoring unit equipped with hydrogen sulphide and sulphur dioxide analyzers, as well as equipment to electronically measure wind speed and direction. This equipment allows EUB staff to conduct mobile and stationary ambient air monitoring throughout the province.

Mobile monitoring involves having the unit staffed and operated to be able to detect, monitor, and evaluate emissions from a facility. If fugitive emissions are detected, the unit's mobile capabilities allow the operator to track the plume to obtain representative air samples and determine the location of the source.

Stationary monitoring refers to setting the unit in a stationary position, usually not staffed, for a period of more than six hours. Stationary monitoring is conducted to detect emissions that may occur intermittently at a given location. For example, the unit might be set on the property of a resident who has registered an odour complaint with the EUB.

Mobile and stationary monitoring may be performed when a complaint is registered and is also carried out routinely based on a yearly plan developed by each of the field centres. Use of the monitoring unit is coordinated out of the Calgary field centre. The EUB mobile monitoring unit spent 48 days in the field during 1999/2000.

6.3.2 Response to Odour Compiaints

The monitoring vehicle responded to 41 odour complaints during 1999/2000. Of these, the unit detected fugitive emissions at five facilities. Immediate corrective action was taken at all of the unsatisfactory facilities. One facility was suspended and a meeting was held to ensure that corrective actions were taken and that a protocol was enacted to achieve lasting improvements.

EUB Action

- Facilities that were the source of odour problems will be considered for routine monitoring during the 2000/2001 year.

6.3.3 Routine Mobile Monitoring, Suspensions, and Emergency Response

Each field centre created a list of facilities for routine air quality monitoring for the 1999/2000 reporting year based on the following criteria:

- sour facilities with a history of problems
- newly constructed sour facilities
- new operators/licensees of sour facilities

In 1999/2000 EUB staff monitored 64 facilities for emissions. Unsatisfactory inspections occurred at 9 of the facilities (14 per cent, down from 17 per cent in 1998/1999). Operators of all facilities where emission problems were encountered were notified and took immediate corrective action.

The most common problems found were leaking tank seals and ineffective vapour recovery units on storage tanks. Whenever they found problems, inspection staff stressed the importance of preventive maintenance and early detection to eliminate the occurrence of fugitive emissions.

Operational suspensions occurred at three facilities based on unacceptably high air quality readings recorded by the monitoring equipment. The EUB did not allow these facilities to resume operations until they took remedial action and conducted follow-up monitoring.

As well as carrying out routine monitoring and responding to complaints, the mobile monitoring unit is utilized in emergency response situations. The monitoring unit was not required in an emergency situation in the 1999/2000 reporting year.

EUB Action

- The EUB will continue to use the criteria outlined above to identify and prioritize facilities for routine air quality monitoring.

- The EUB has the option of requiring companies to have their own air monitoring conducted when odour complaints are received by the EUB. EUB staff may also respond to ensure the validity of the monitoring being conducted.

- The EUB is confident that a continued cooperative approach will result in immediate resolution of the issues at hand and that greater attention to preventive maintenance will yield long-lasting improvements. Where immediate resolution to problems is not feasible, the EUB can suspend a facility.

- Where facilities are having repeat emission problems, operators can expect escalating enforcement action.

6.4 Waste Management Initiatives

6.4.1 Waste Management Facilities

The EUB made progress in 1999/2000 in regulating oilfield waste management facilities. The Waste Inspection Audit Team (WIAT) achieved its goals and developed a fully operational inspection and audit program for third-party oilfield waste management facilities. The actions targeted in the 1998/1999 provincial summary, specifically inspection of all approved waste management facilities and the finalizing of an inspection manual for waste facilities, were accomplished.

The EUB took a two-stage inspection approach for the 1999/2000 year. During the first stage, staff conducted a review of the facilities to allow the WIAT to be able to field test its new draft waste management facility inspection manual and to provide an opportunity to make the operators of these facilities aware of the EUB's requirements and expectations. During this stage, inspectors did not apply the EUB enforcement ladder. Rather, they reviewed the various components and processes and simply reported them as either "satisfactory" or "unsatisfactory."

In the first stage, 10 facilities were found to be satisfactory and 33 had varying degrees of unsatisfactory items. Most of the concerns were with inadequate housekeeping and noncompliance with *Guide 58: Oilfield Waste Management Requirements for the Upstream Petroleum Industry* and *Guide 55: Storage Requirements for the Upstream Petroleum Industry*. If the EUB determined that the facility was causing adverse effects, it initiated appropriate actions immediately.

The second stage began in September 1999 and involved inspections whereby the draft inspection manual was further tested in preparation for publication in the fall of 2000. During this round of inspections, inspectors applied the EUB enforcement ladder where appropriate. Generally, there was an overall improvement in compliance. EUB staff inspected 42 waste management facilities. Of those, 22 resulted in satisfactory inspections. In the 20 facilities assessed as being unsatisfactory, the majority of the unsatisfactory items were of a minor nature. Three inspections yielded major unsatisfactory items.

In addition to the field inspections, the EUB has developed an audit/inspection process, the result of collaboration between staff from the EUB's head office and the field centres. An audit/inspection combines a paper review with a physical inspection, ensuring compliance from construction to process, including operations and record keeping.

In 1999/2000 staff conducted five facility audit/inspections. The results showed that most of the noncompliance items were minor.

EUB Action

- Facility inspections will continue in 2000/2001. All third-party waste management facilities will be inspected this year.
- Unsatisfactory inspections will be categorized as minor, major, and serious in 2000/2001.
- Audit/inspections are scheduled for eight facilities in 2000/2001.
- Education and awareness are integral to how the EUB conducts its business. Accordingly, field inspectors will continue to meet with facility operators during their inspections or audits to ensure a complete understanding of EUB requirements.

6.4.2 Drilling Waste Management

In 1996 the EUB issued *Informational Letter (IL) 96-13* and a revised *Guide 50: Drilling Waste Management*, identifying the three agencies responsible for regulating Alberta's drilling waste management:

- EUB – private land,
- Public Lands (Agriculture, Food and Rural Development [AFRD]) – public land white area, and
- Land and Forest Service (Alberta Environment [AENV]) – public land green area.

In 1999/2000 these agencies worked together to complete a common document used by all three jurisdictions to consistently audit drilling waste management. In early 1999, a drilling waste audit/inspection team was formed to further develop specific audit/inspection criteria for the EUB.

During 1999/2000 the drilling waste audit/inspection team concentrated its efforts on the development of inspection criteria for drilling waste disposal sites. As this was the first year for the new inspection procedures, the team spent a significant amount of time on education and awareness relative to *Guide 50: Drilling Waste Management*. The information gathered has been included in the draft drilling waste inspection manual, which will be field tested in 2000/2001.

In total, 299 field inspections were conducted in 1999/2000 on drilling waste sites. Of those, 250 (83.6 per cent) were found to be satisfactory, with 49 (16.4 per cent) being unsatisfactory. The primary reasons for receiving an unsatisfactory inspection were poor housekeeping, not actively managing the site, and inappropriate application on the site.

EUB Action

- All operators are expected to be aware of and abide by the requirements in *Guide 50*. Depending on the significance of the unsatisfactory items uncovered, an inspector

may choose to educate the operator about requirements or apply more stringent enforcement actions.

- The EUB has created a provincial inventory of invert land treatment sites on private lands and will conduct inspections in 2000/2001.

- The EUB has drafted a drilling waste inspection manual to be used in 2000/2001. After a year of trial and editing, the final drilling waste inspection manual will be implemented in 2001/2002. Unsatisfactory inspections will be categorized as minor, major, and serious at this time.

Section 7 Packer Isolation Testing and Reporting

7.1 Introduction

The testing and reporting requirements for all wells that require a production packer are outlined in *Informational Letter (IL) 94-18: Isolation Packer Tests, Testing and Reporting Requirements*. Annual isolation packer tests are required on all wells that inject fluids other than potable water and flowing sour gas wells greater than 50 moles per kilomole. Companies must submit test results to the EUB on an annual basis. Wells that fail the test must be repaired and retested and the test results submitted to the EUB.

The goals of the EUB's packer isolation testing and reporting program are to

- maintain the integrity of wells that require packers for environmental reasons,
- improve industry awareness, understanding of, and compliance with requirements, and
- apply firm and fair enforcement.

7.2 Inspection Results

The 1999/2000 reporting year started with an inventory of 7356 wells that required testing and reporting under EUB requirements.

Ten companies were issued closure orders on a total of 11 wells, one as a result of a company failing to conduct a packer isolation test and the other 10 because of failed packer isolation tests and companies not taking remedial action. This is a decrease from last year, when 22 companies were issued closure orders on 34 wells. Only one well that was issued a closure order went to an abandonment order.

Figure 27 shows a 99.98 per cent overall compliance rate in testing and reporting for the 1999/2000 year. Virtually the same compliance rate was achieved in 1997/1998 and 1998/1999. The high compliance indicates that industry continues to accept its responsibility in meeting EUB requirements.

EUB Action

- The EUB will continue to provide a process to ensure that industry is aware of and accountable for meeting the packer isolation testing and reporting requirements.

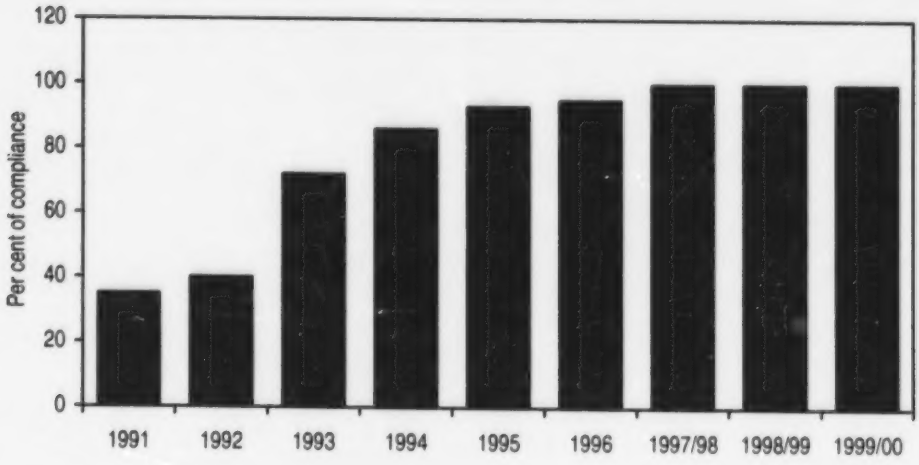

Figure 27. Overall compliance rate for wells that require packer isolation tests